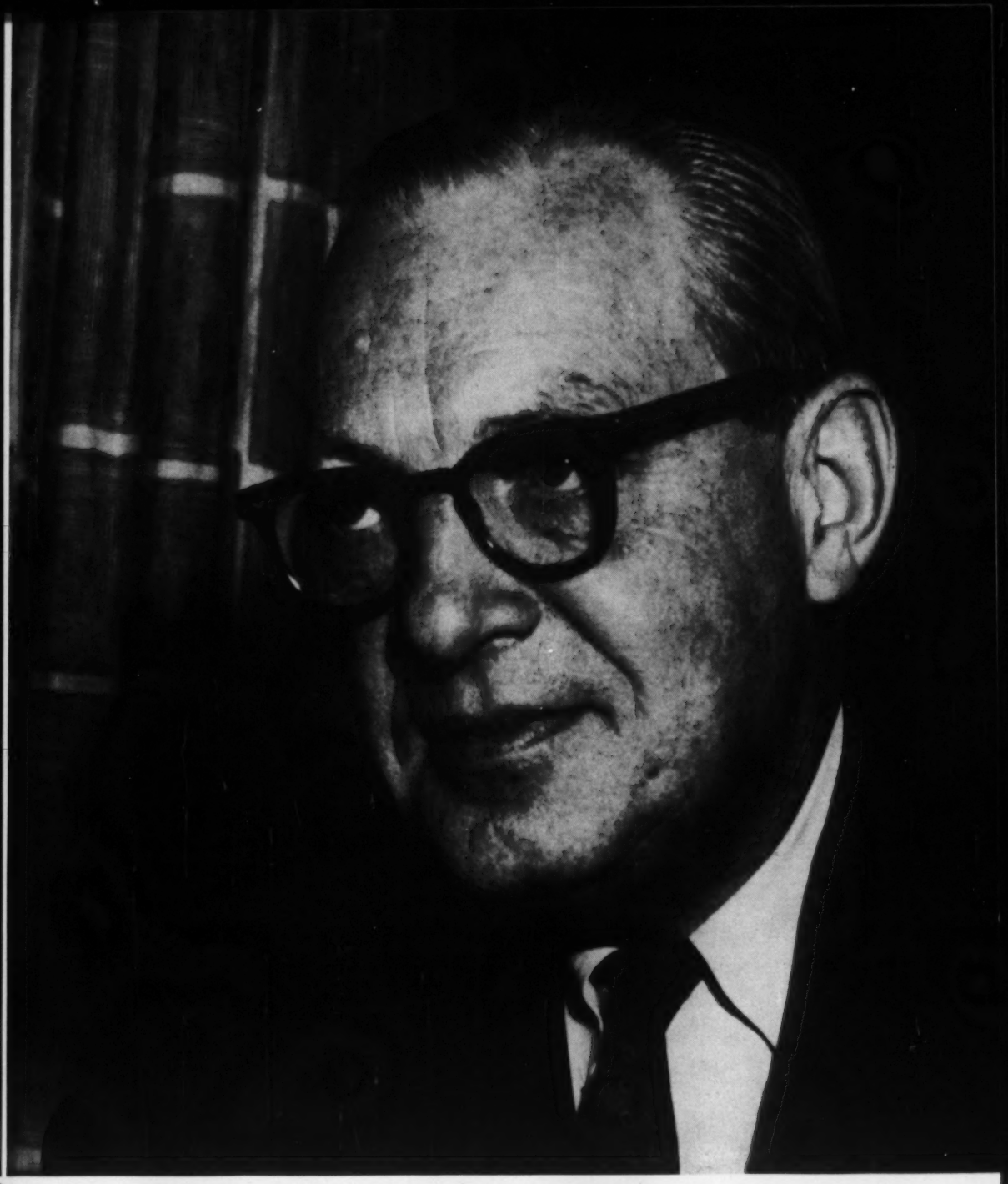
STEEL
The Metalworking Weekly
A PENTON PUBLICATION
FEBRUARY 27, 1961



William R. Butler tells some of the ways Alcoa meets . . .

PROGRAM FOR MANAGEMENT

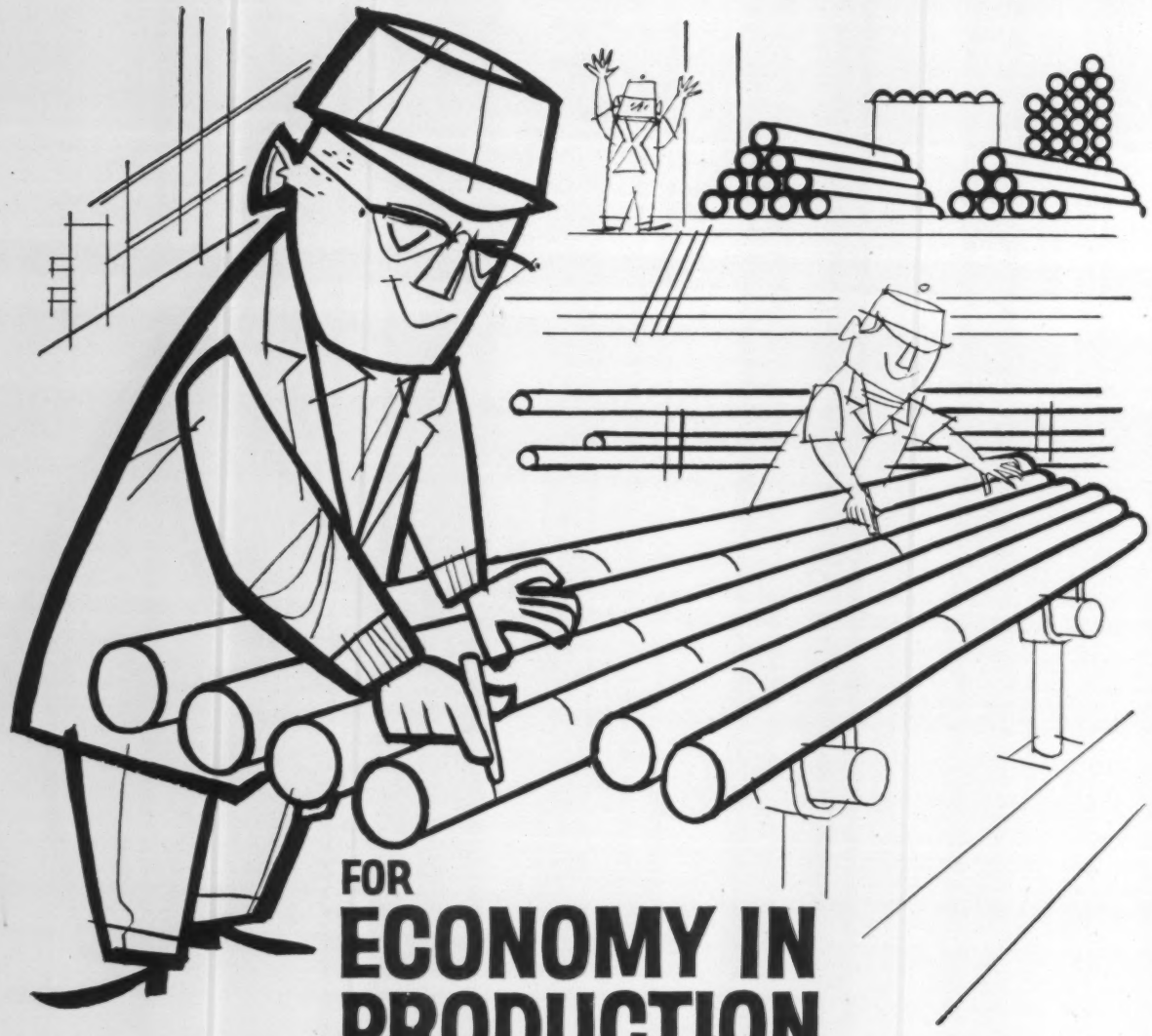
Our Challenge from Nonmetallics . . 77

How Much Bounce in the Spring Upturn? 67

Vacuum Enhances Investment Casting . . 114

Outlook for Structural Steel Sales . . . 149

METALWORKING WEEK—PAGE 17
COMPLETE CONTENTS—PAGE 19



FOR ECONOMY IN PRODUCTION SPECIFY

B&W *Job-Matched Tubing*

B&W offers:

- Quality controlled tube properties in the right combination for ease of fabrication
- Quality controlled surface finishes to match end-use applications
- Quality control that assures uniformity from tube to tube for fast production

And quality control is just one of the many reasons why it pays to specify B&W Job-Matched Tubing. And—matching tubes to jobs assures you the right tube, in the right quantity at the right time. For more information, call your local B&W District Sales Office or write for Bulletin TB-420. Remember, too, B&W Job-Matched Tubes are handled by Steel Service Centers all about the country. The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pennsylvania.

Steel

B&W

THE BABCOCK & WILCOX COMPANY

TUBULAR PRODUCTS DIVISION

TA-9068-G

Seamless and welded tubular products, solid extrusions, seamless welding fittings and forged steel flanges—in carbon, alloy and stainless steels and special metals

Bethlehem engineers redesigned these cost-saving specials.

Steel

for Strength
. . . Economy
. . . Versatility

Each of these special fasteners was redesigned to do a better job. And each represents a reduction in cost for the customer. Bethlehem's fastener engineers were able to come up with improved designs to solve a specific problem.

Perhaps a fastener you are now using should be studied to see if its redesign could cut your costs. Just send us a sample of the part, or a drawing or sketch of what you need. Maximum results will be obtained when you supply a detailed description of the end use.

Our fastener engineers will look it over and give you an honest appraisal of what can be done. Call the nearest Bethlehem sales office. Or write to us at the address below.

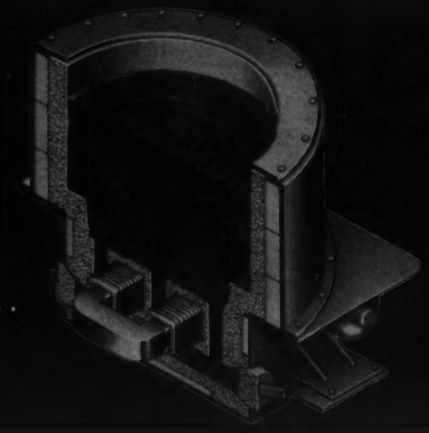
BETHLEHEM STEEL COMPANY, Bethlehem, Pa. Export Sales: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

FOR NEW IDEAS IN

HEATING AND MELTING BY INDUCTION...



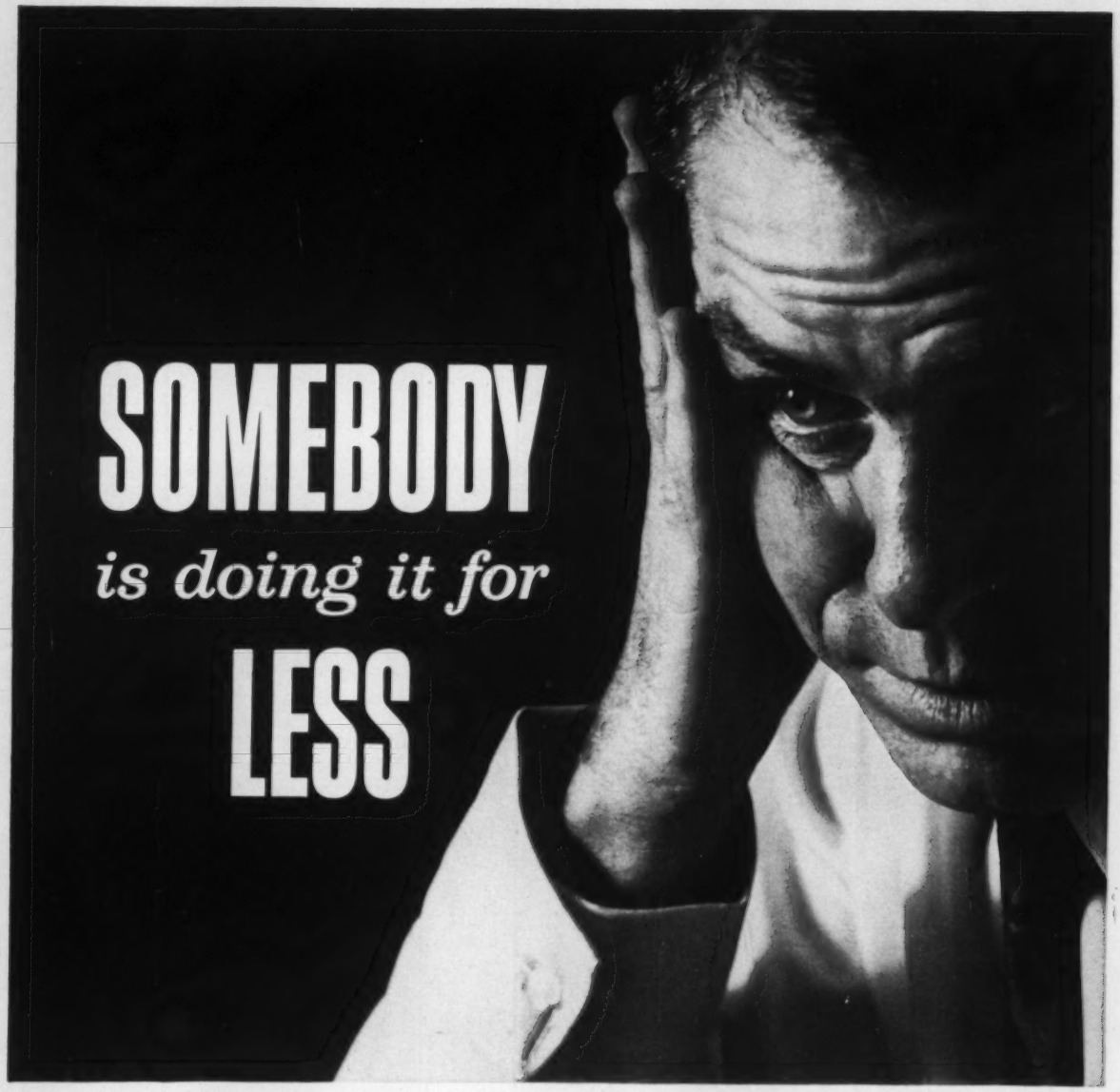
WATCH AM

Core-type melting furnace, one of many products of AM, for the heating or melting of metals by induction.

"induction heating is our only business"

AJAX Magnethermic CORPORATION

GENERAL OFFICES P.O. Box 839 • Youngstown 1, Ohio
TRENTON DIVISION 930 Lower Ferry Road • Trenton 5, New Jersey
YOUNGSTOWN DIVISION 3990 Simon Road • Youngstown 12, Ohio
AJAX MAGNETHERMIC, CANADA, LTD. Box 779 • Ajax, Ontario



MASTERLINE® 51B SUPERFINISHER

Newest in the line—for parts not requiring traverse of the Superfinishing stone. A longitudinally adjustable platen supports a reciprocating unit holding one or two stone-carrying quills. Add a second platen and you can handle up to four diameters at once—automatically.

A similar **Model, 52A** offers longitudinal stone traverse. You can select from a complete line of general-purpose and high-production machines and attachments. Call your Gisholt Representative or write for Catalog 1159-C.

Are you giving your competitors a decisive edge by using outdated surface-finishing methods?

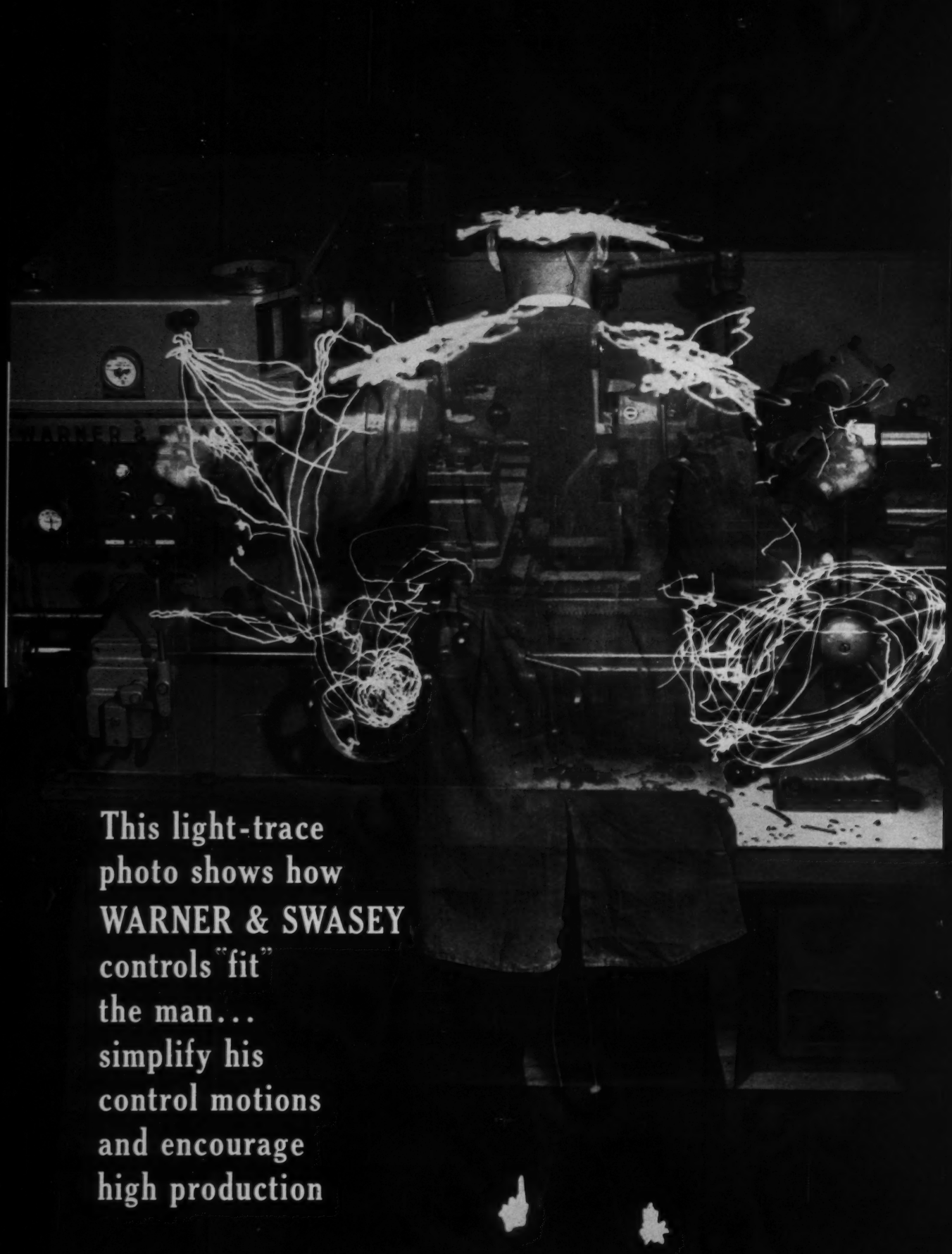
If you need a controlled finish (1 micro-inch RMS to 80) on cylindrical, tapered, flat or spherical surfaces, Superfinishing will cut your costs and improve quality.

In many cases you can Superfinish® direct from a turned surface and eliminate grinding. On other parts you rough-grind, then Superfinish. Your finish is produced in seconds, *automatically*, piece after piece!

You save on initial investment, grinding-wheel costs, production time, work-handling, and floor space. With optional "size control" you can even eliminate final inspection.

GISHOLT
MACHINE COMPANY
Madison 10, Wisconsin, U.S.A.

Turret Lathes • Automatic Lathes • Balancers • Superfinishers • Threading Lathes • Factory-Rebuilt Machines with New-Machine Guarantee



This light-trace
photo shows how
WARNER & SWASEY
controls "fit"
the man...
simplify his
control motions
and encourage
high production

In Two Decades

The gentleman pictured above hasn't changed much since 1941, has he? He's Benjamin F. Fairless, then president of U. S. Steel Corp. and now president of the American Iron & Steel Institute.

We happened upon his picture while browsing through the Feb. 24, 1941, issue of STEEL. He was shown coming out of the White House where he had been discussing steel production figures with President Franklin D. Roosevelt.

Ingot output that week was 1,550,000 tons, 94.5 per cent of 1941's weekly capacity.

It's about 1,500,000 tons this week too, but we're operating at only around 50 per cent of capacity.

Brighter Future

Yet, the current production doldrums will be just an unpleasant memory when some of the industry's new marketing plans bear fruit. Turn to Page 77 for a synopsis of them.

All metal producing industries have big ideas, as outlined in the fourth installment of STEEL's 1961 Management Series on profit growth.

20-Year Growth

While we're on the subject of growing, we'll slip this one in: STEEL, the magazine, has done some growing in the last score of years.

We had 23 editors in 1941; 33 are on our masthead now. Twenty years ago, we had a press run of 13,000; it's 55,000 now.

But of all the growth, the editors are proudest of one that has led to a contraction. With tighter writing and better layouts, they are giving you more information in 70 pages each week in 1961 than in the 80-page weekly editorial average for 1941.

Usership Note

Ralph H. Stearns, industrial engineering manager for American Optical Co., has won a second $500. He was the September, 1960, winner of the initial $500. STEEL has now given $8500 in Usership Awards for the 1960 contest.

The Annual Curse

Income tax payment time is nearly two months away, but we thought you'd like this reminder (from Cleveland Letter Service Inc.):

Two score and some years ago our fathers brought forth upon this nation a new tax, conceived in desperation and dedicated to the proposition that all men are fair game.

Now we are engaged in a great mass of calculations, testing whether that taxpayer or any taxpayer so confused and so impoverished can long endure.

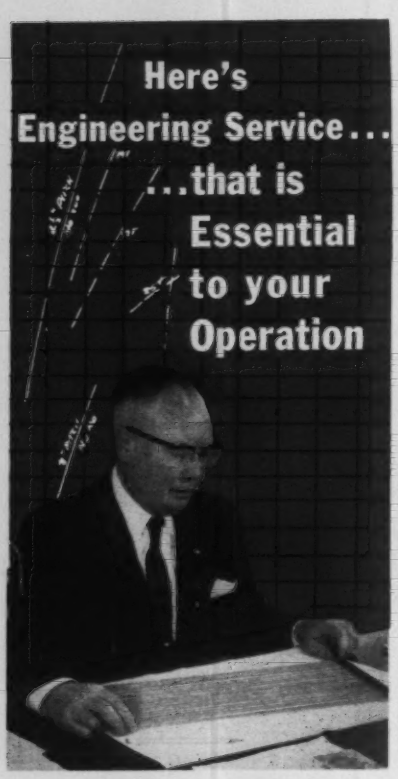
We are met on Form 1040. We have come to dedicate a large portion of our income to a final resting place with those men who here spend their lives that they may spend our money.

It is altogether anguish and torture that we should do this, but in a legal sense we cannot evade; we cannot cheat; we cannot underestimate this tax. The collectors, clever and sly who compute here, have gone far beyond our power to add or subtract.

Our creditors will little note nor long remember what we paid here, but the Internal Revenue Service can never forget what we report here.

It is for us taxpayers rather to be devoted here to the tax return which the government has thus far so nobly spent. It is from these vanquished dollars that we take increased devotion to the few remaining; that we here highly resolve that next year shall not find us in a higher income bracket; that this taxpayer, underpaid, shall figure out more deductions, and that taxation of the people, by the Congress, and for the government shall not cause our solvency to perish from the earth.

STEEL, the metalworking weekly, is selectively distributed without charge to qualified management personnel with administrative, production, engineering, or purchasing functions in U. S. metalworking plants employing 20 or more. Those unable to qualify, or those wishing home delivered copies, may purchase copies at these rates: U. S. and possessions and Canada, $10 a year; all other countries, $30 a year; single copies, 50 cents. Metalworking Yearbook issue, $2. Published every Monday by The Penton Publishing Co., Penton Bldg., Cleveland 13, Ohio. Accepted as controlled circulation publication at Cleveland, Ohio.



– and it's part of

ACME'S

Basic Policy

Whether it's technical advice or field assistance, it has always been and will continue to be part of Acme's Basic Policy to make "all the knowledge and assistance of their Engineering Department" available to help manufacturers solve their problems.

Acme Engineers will be glad to advise you as to chain size and selection that may save you both time and money. For any problem involving roller chains, don't hesitate to consult with your Acme Distributor or to call or write our Engineering Department for assistance.

Write Dept. 10-F for new ill. 100 page catalog with engineering section.

Acme Chain Corporation

RELIABLE CHAIN DRIVES FOR ALL INDUSTRIES

ROLLER CHAINS, SPROCKETS, CONVEYOR CHAINS, FLEXIBLE COUPLINGS, ATTACHMENTS. (Special and Standard)

STEEL The Metalworking Weekly

Editor, WALTER J. CAMPBELL

Associate Managing Editors, VANCE BELL, JOHN S. MORGAN

WILLIAM E. DEAN .....News Editor
WILLIAM M. ROONEY .....Market Editor
ROBERT F. HUBER .....Machine Tool Editor
EDWARD N. CASE .....Metallurgical Editor
HARRY CHANDLER .....Copy Editor
GLENN W. DIETRICH ..Associate Copy Editor
FRANK R. BRIGGS .....Associate Editor
ROBERT O. JAYNES .....Associate Editor
ROSS WHITEHEAD .....Associate Editor
GEORGE J. HOWICK .....Associate Editor
NEIL C. ROBERTS .....Associate Editor
DONALD E. HAMMERSTROM..Associate Editor
DERRY EYNON .....Assistant Editor
JOHN TERESKO .....Assistant Editor
MARY T. BORGERHOFF .....Assistant Editor
EILEEN CORTES .....Assistant Editor
MARY ANN STUVE .....Editorial Assistant
SUE MOORE .....Editorial Assistant

THOMAS H. BRYAN, TOM WELSH, Art Editors

IRENE KASNER, Editorial Service

Resident Editors

New York 17 .....60 E. 42nd St.
B. K. PRICE, L. E. BROWNE
BRIAN WILSON, REED TRASK
Murray Hill 2-2581

Chicago 11 .....520 N. Michigan Ave.
ERLE F. ROSS, AUSTIN E. BRANT
Whitehall 4-1234

Pittsburgh 19 .....2837 Koppers Bldg.
WILLIAM V. WALLACE—Atlantic 1-3211

Detroit 35 .....15800 W. McNichols Rd.
A. DONALD POSTMA—Broadway 3-8150

Washington 4 ....1123 National Press Bldg.
JOHN R. BOTZUM—Executive 3-6849

Editorial Correspondents

Buffalo—Emerson 5385 ....GEORGE E. TOLES
Youngstown—Riverside 7-1471..GEO. R. REISS
Cincinnati—Beechmont 1-9607...DICK HAVLIN
Birmingham—Fairfax 3-5381..IRVING BEIMAN
St. Louis—Garfield 1-1212 HAMILTON THORNTON
Houston—Republic 4-5766 ..LOUIE E. MATHIS
Los Angeles—Webster 5-1234..NORMAN LYNN
San Francisco—Exbrook 7-5700 EDWIN HAVERTY
Seattle—Melrose 2-1895 .....R. C. HILL
Toronto, Canada—Oxford 4-6755..F. S. TOBIN
Birmingham, England .....J. A. HORTON
Brussels, Belgium .....PAUL DE KEYSER

Dusseldorf, Germany, DR. HERBERT GROSS

BUSINESS STAFF

Business Manager, S. F. MARINO

Advertising Director ....C. A. TALLINGER JR.
Advertising Service Mgr. ...DORIS MITCHELL
Production Manager .....A. V. ANDERSON
Promotion Manager ....THOMAS J. HARMON
Classified Advertising .....EVELYN DIETZ
Market Research Mgr. ....T. M. BALLANTINE
Circulation Director .....J. C. GERNHARD
Circulation Manager .....P. B. KEEFE
Distribution Manager .....G. R. EBERSOLE
Reprints .....JUNE SCHILENS

Advertising Representatives

New York 17 .....60 E. 42nd St.
K. A. ZOLLNER, GUY LABAW
Murray Hill 2-2581

Wynnewood, Pa. (Phila.) 200 Wynnewood Ave.
WM. J. VERSCHOOR—Midway 2-6512

Farmington, Conn. .....12 Farmstead Lane
CALVIN FISHER JR.
Orchard 7-1756

E. Rochester, N. Y. .....217 Ridgeview Dr.
HAROLD A. DENNIS—Browning 1-2105

Pittsburgh 19 .....2837 Koppers Bldg.
JOHN E. MacARTHUR—Atlantic 1-3211

Cleveland 13 .....Penton Bldg.
J. K. GILLAM, N. W. MANNING
JOHN B. KELLY
Main 1-8260

Cincinnati 6 .....2215 Victory Parkway
E. L. FRANKE—Parkway 1-0711

Detroit 35 .....15800 W. McNichols Rd.
DONALD C. HYDE
Broadway 3-8150

Chicago 11 .....520 N. Michigan Ave.
W. L. POLAND, WM. J. D'ALEXANDER
RICHARD BIRDSONG
Whitehall 4-1234

Los Angeles 36 .....5943 W. Colgate Ave.
F. J. FULLER—Webster 1-6865

San Francisco 4 .....57 Post St.
Robert W. Walker Co.—Sutter 1-5568

Birmingham 9 .....249 La Prado Place
FRED J. ALLEN—Tremont 1-8598

Clearwater, Fla. .....1954 Jeffords Dr.
H. G. ROWLAND—(Clearwater) 31-4121

Dallas 35 .....818 Exchange Bank Bldg.
JAMES H. CASH—Fleetwood 1-4523

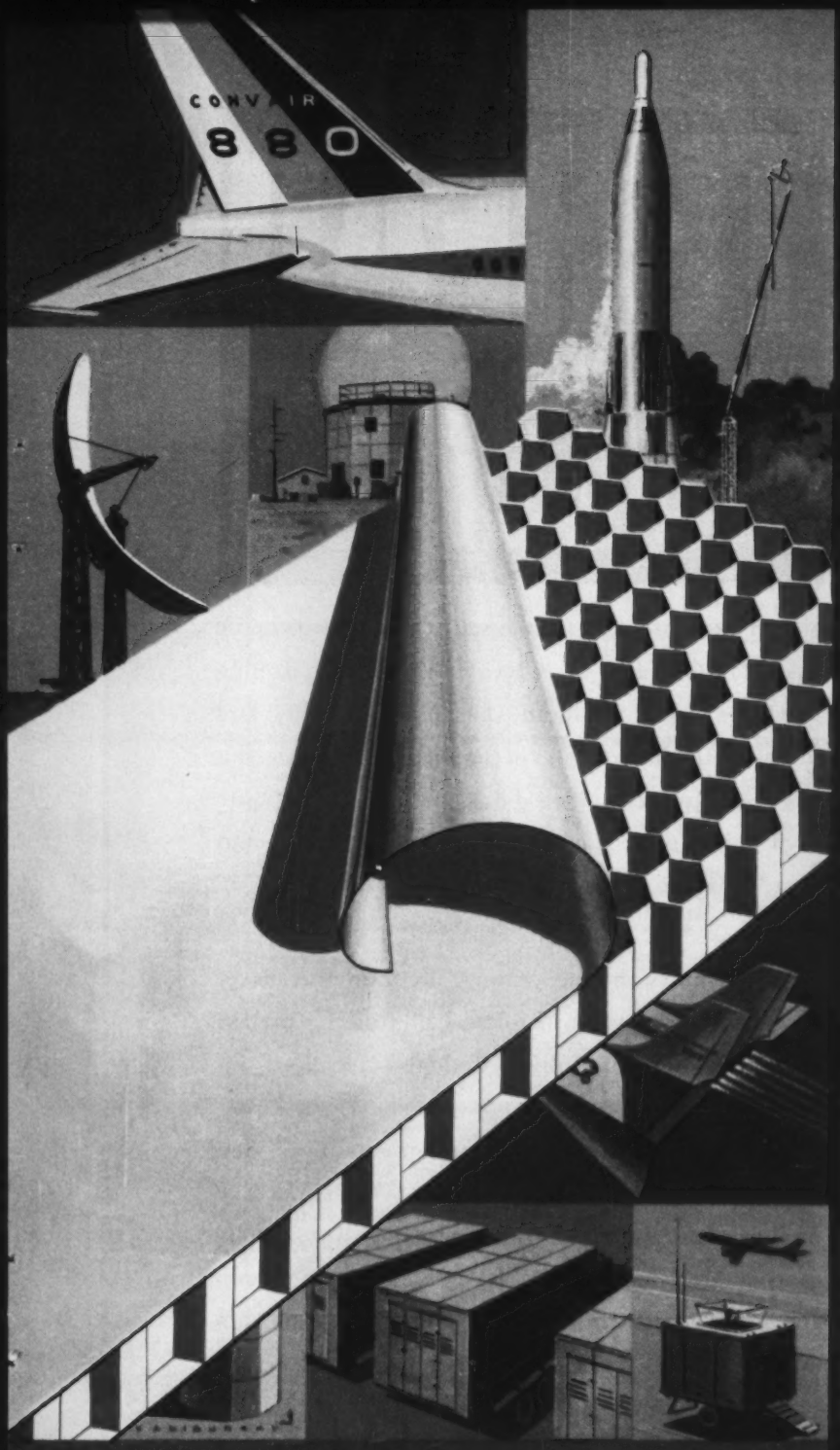
BPA

NBP

Published Every Monday by
THE PENTON PUBLISHING CO., Penton Bldg., Cleveland 13, Ohio
Main 1-8260

GEORGE O. HAYS .....Chairman
RUSSELL C. JAENKE .....President
FRANK G. STEINEBACH .....Vice Pres. and Secretary
FRANK O. RICE .....Vice President
JOSEPH P. LIPKA .....Vice Pres. and Treasurer
DAVID C. KIEFER .....Vice Pres.—Marketing
IRWIN H. SUCH .....Vice Pres.—Editorial

Also Publisher of
FOUNDRY, MACHINE DESIGN, NEW EQUIPMENT DIGEST, AUTOMATION
Member of Business Publications Audit of Circulation Inc., Society of Business Magazine Editors, and National Business Publications Inc.



From Avco/Nashville... structures to order

Avco/Nashville specializes in applying engineering imagination to a wide variety of structural problems. One result is an exciting new family of structures offering features that go far beyond the limitations of the original materials.

Nashville Division is now producing honeycomb structures that have unusual strength and heat resistance, yet are light enough to float on water. Employing its new *Avcoramic* process, Nashville Division makes *Avcomb* stainless steel panels for the B-70 supersonic bomber. It also produces aluminum honeycomb components for Convair 880 and 600 jet transports, and radar reflectors of fibre glass, aluminum and stainless steel sandwich construction.

Although the first applications for these jet-age materials have been in missiles and supersonic aircraft, Avco development engineers are actively investigating new uses. These include communications shelters, droppable buoys, lightweight ground support equipment, and many other applications requiring a high strength/weight ratio.

The engineering staff of the Nashville Division is ready to assist you in adapting new methods and new materials to meet your requirements for lightweight structures.

UNUSUAL CAREER OPPORTUNITIES FOR QUALIFIED SCIENTISTS AND ENGINEERS ... WRITE AVCO/NASHVILLE TODAY.

Avco / Nashville

For full information, write General Marketing Manager—Structures, Nashville Division, Avco Corporation, Nashville 1, Tennessee.

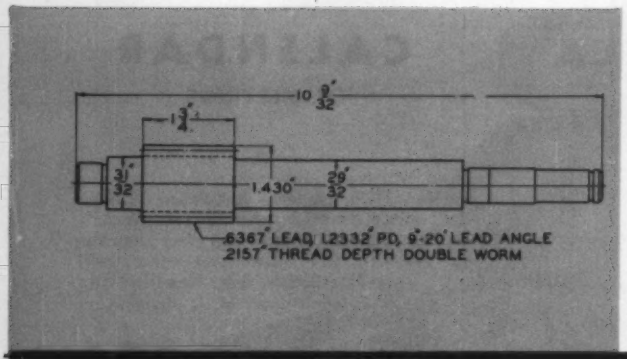
THREAD ROLLING

Shown here are five field installations in which the LANHYROL and LAN-NU-ROL Thread Rolling Machines have produced outstanding results and surpassed the highest of expectations. Production data from these representative jobs, shown on the opposite page, indicate the unequalled output, flexibility, and range coverage of these revolutionary machines.

Both Machines produce strong, accurate threads of excellent finish by the chipless, cold-forming process using four different Rolling Methods—Thrufeed, Infeed, Continuous and Reciprocal. The larger LANHYROL will thread all diameters from 0 to 3″ and the smaller LAN-NU-ROL 0 to 2″. Each Machine produces left- and right-hand threads of all types (except square), including UNC, UNF, Acme, Worm, and many special forms and is well adapted for automated processes. Soon to be announced will be the HY-DUTY Thread Rolling Machine. It will have a larger diametrical capacity than either the LANHYROL or LAN-NU-ROL. Watch for it soon.

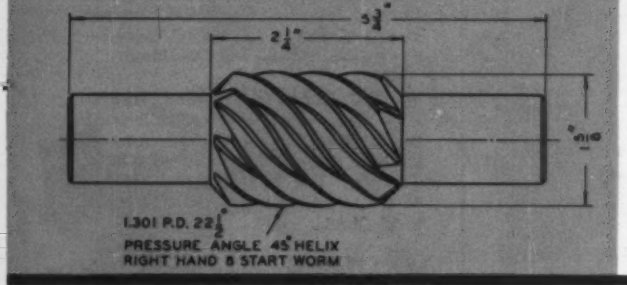
LANDIS *Machine* COMPANY
WAYNESBORO, PENNSYLVANIA
THE WORLD'S LARGEST MANUFACTURER OF THREADING EQUIPMENT

601C



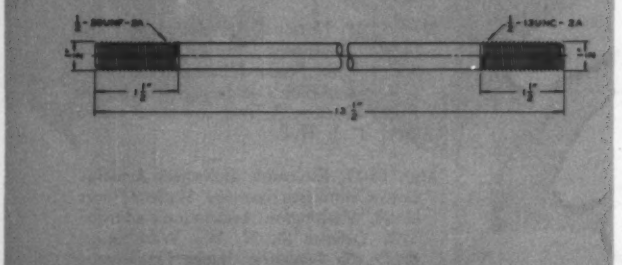
ROLLING INCREASES PRODUCTION FROM 4 TO 200 PER HOUR

Process—Infeed Rolling
Equipment—LANHYROL Thread Rolling Machine
Workpiece—Worm for an automotive-type differential for a riding lawnmower
Material—A.I.S.I. 8620 steel
Thread Specifications:
Diameter—1.430"
Length—1-3/4"
Type—.6367 lead, 1.2332" P.D., 9°-20' lead angle, .2157" thread depth, double worm
Production—200 pieces per hour (at 100% efficiency)



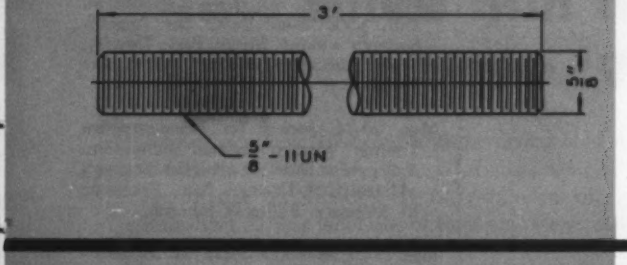
AUTOMATED ROLLING OF COARSE WORM PINION

Process—Reciprocal Rolling
Equipment—LANHYROL Thread Rolling Machine
Workpiece—Gear-reducer worm
Material—C1018 steel
Thread Specifications:
Diameter—1-5/8"
Length—2-1/4"
Type—8 start, 1.301" P.D., 22-1/2° pressure angle, 45° helix, right-hand worm
Production—180 pieces per hour (at 100% efficiency)



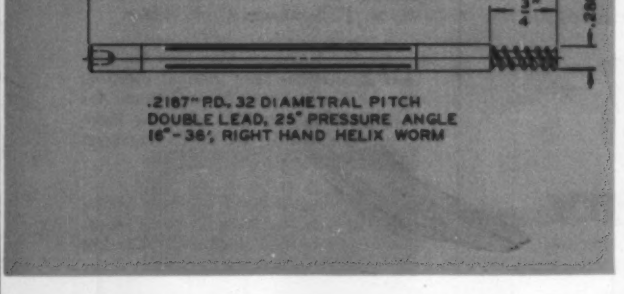
ROLLING DIFFERENT DIAMETER AND PITCH THREADS IN ONE PASS

Process—Continuous Thread Rolling
Equipment—"Extended Spindle" LANHYROL Thread Rolling Machine
Workpiece—Double-end stud
Material—8640 steel
Thread Specifications:
Diameter—1/2" (both ends)
Length—1-1/2" (both ends)
Type—20 pitch U.N.F. one end, 13 pitch U.N.C. on the opposite end
Tolerance—2A (both ends)
Production—103 pieces (both ends threaded) per minute (at 100% efficiency)



AUTOMATIC THRUFEED ROLLING CUTS LABOR COST

Process—Automatic Thrufeed Thread Rolling
Equipment—LAN-NU-ROL Thread Rolling Machine
Workpiece—Continuously-threaded bar
Material—A.I.S.I. 1018 steel
Thread Specifications:
Diameter—5/8"
Length—3'
Type—11 pitch UN
Production—216 inches per minute (at 100% efficiency)



LAN-NU-ROL PROVES IDEAL FOR SHORT-RUN WORM ROLLING OPERATION

Process—Infeed Rolling
Equipment—LAN-NU-ROL Thread Rolling Machine
Workpiece—Motor armature shaft for hand mixer
Material—A.I.S.I. C1040 steel
Thread Specifications:
Diameter—.2805"
Length—3/4"
Type—.2187" pitch diameter, 32 diametral pitch, double lead, 25° pressure angle, 16° 36', right-hand helix worm
Production—368 pieces per hour (at 100% efficiency)

URICK'S FORMULA FOR BETTER GRAY IRON...

URITE*

**URITE—is poured in various grades with tensile strengths from 30,000 PSI to 60,000 PSI and, upon request, is alloyed to conform to customer specifications.*

FORMULA: **M + I + T + C + P = U = $**

M = Best Raw MATERIALS Regardless of Cost

I = Thorough INOCULATION

T = Good Basic Foundry TECHNIQUES

C = Constant CHECKS & CONTROLS

P = PRIDE of Workmanship (so often lacking today)

U = URITE, a Denser, Tighter, Tougher, Better Machining Iron

$ = Dollars in your pocket when you specify URITE castings.

Contact URICK, the foundry that starts with "U" and stays with you. Write for advanced technical data about URITE gray iron castings.

URITE CASTINGS

URICK FOUNDRY

ERIE, PENNSYLVANIA

CALENDAR OF MEETINGS

Mar. 11-15, National Association of Secondary Material Industries Inc.: Annual convention, Fairmont and Mark Hopkins Hotels, San Francisco. Association's address: 271 Madison Ave., New York 16, N. Y. Administrator: M. J. Mighdoll.

Mar. 13-14, Steel Founders' Society of America: Annual meeting, Drake Hotel, Chicago. Society's address: 606 Terminal Tower, Cleveland 13, Ohio. Executive vice president: F. Kermit Donaldson.

Mar. 13-17, Industrial Diamond Association Inc.: Annual meeting, Hollywood Beach Hotel, Hollywood, Fla. Association's address: 587A Newark-Pompton Turnpike, Box 175, Pompton Plains, N. J. Executive manager: Mrs. Margaret J. McGinnis.

Mar. 13-17, Society of Automotive Engineers Inc.: National automobile meeting, Sheraton-Cadillac Hotel, Detroit. Society's address: 485 Lexington Ave., New York 17, N. Y. Secretary: Joseph Gilbert.

Mar. 13-17, National Association of Corrosion Engineers: Annual convention and exhibit, Statler-Hilton Hotel, Buffalo. Association's address: 1061 M&M Bldg., Houston 2, Tex. Executive secretary: T. J. Hull.

Mar. 15-17, Electronic Industries Association: Committee meetings, Statler-Hilton Hotel, Washington. Association's address: 1721 DeSales St. N. W., Washington 6, D. C. Secretary: James D. Secrest.

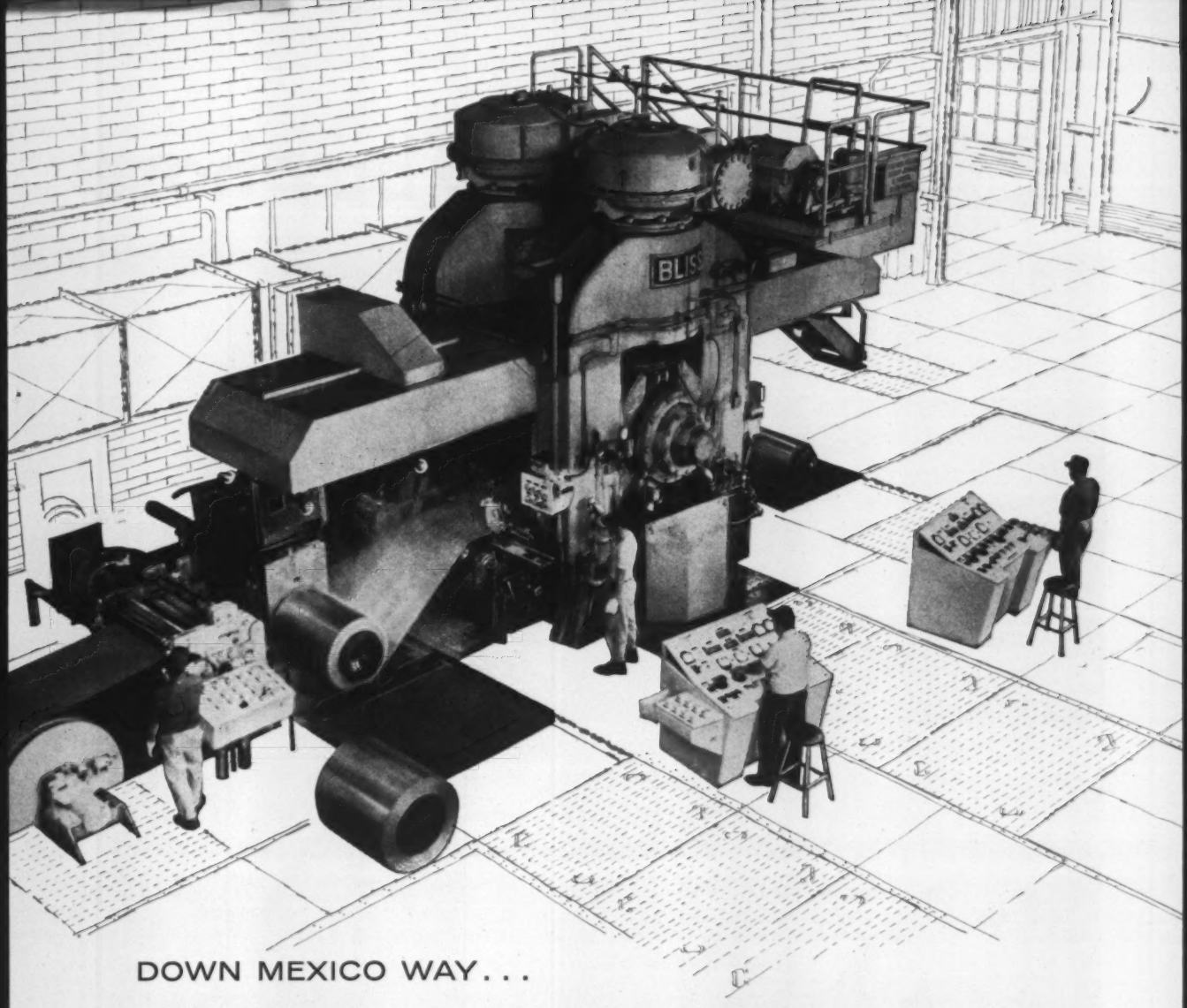
Mar. 20-24, American Society of Metals: Western metal congress and exposition, Pan-Pacific Auditorium, Los Angeles. Society's address: Metals Park, Novelty, Ohio. Managing director: Allan Ray Putnam.

Mar. 20-24, Society for Nondestructive Testing: Western regional convention, Ambassador Hotel, Los Angeles. Society's address: 1109 Hinman Ave., Evanston, Ill. Secretary: Philip D. Johnson.

Mar. 21-23, American Society of Mechanical Engineers: American power conference, Sherman Hotel, Chicago. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: O. B. Schier.

Mar. 22-24, American Hot Dip Galvanizers Association Inc.: Annual meeting, Royal Orleans Hotel, New Orleans. Association's address: 5525 Manning Place N.W., Washington 16, D. C. Secretary: Charles E. Perry.

Mar. 22-24, Pressed Metal Institute: Spring technical meeting, Belmont Plaza Hotel, New York. Institute's address: 3673 Lee Rd., Cleveland, Ohio.



DOWN MEXICO WAY . . .

New Bliss mill ups steel production 25% in one year

Recently, a new Bliss four-high reversing cold mill went into action at Hojalata y Lamina, S.A., Monterrey, one of Mexico's largest producers of strip and sheet. Here's what one of their major executives has to say about it:

"With this Bliss mill, we can handle strip up to 37" wide, as well as tin plate and sheet at speeds up to 1750 fpm. In 1959, we turned out over 176,000 tons. This year, we're sure to pass 220,000."

With a 14½" and 44" x 42" roll arrangement, the mill reduces mild steel between #27 and #35 gages, turning out raw materials for such end products as metal furniture, pipe and beer-bottle caps. Accessories include: two tension reels capable of handling coils up to 15,000 lbs., coil buggies with rigid, welded-steel frames, cone-type payoff reel, quick-opening flattener and feeder, and roll-changing equipment.

South of the border, north of it and around the free world, Bliss mills are helping plants meet new goals. Can Bliss help you do the same? Judge for yourself by sending for our 84-page Bulletin 40-B.

BLISS
SINCE 1857

Bliss is more than a name . . . it's a guarantee

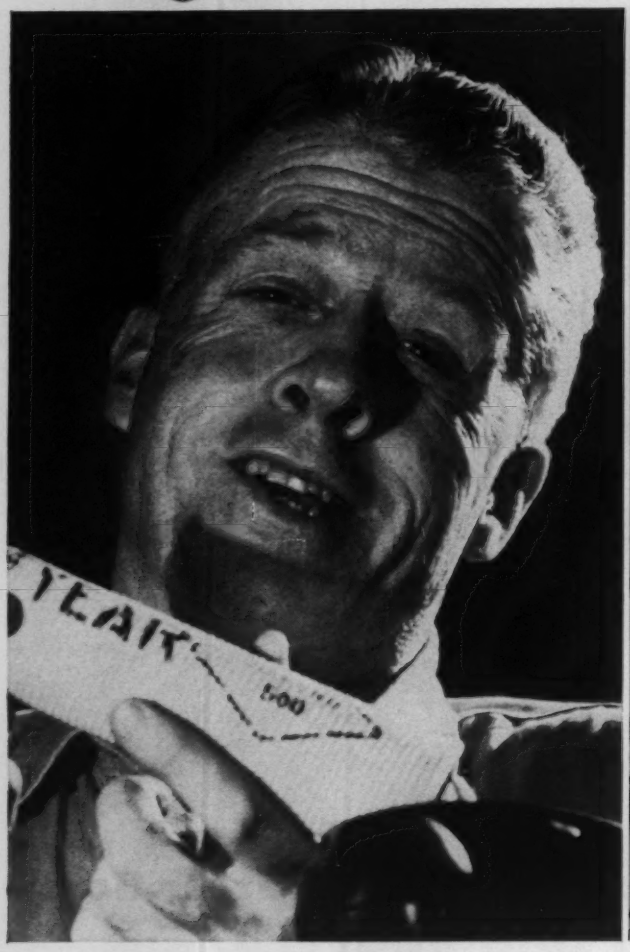
E. W. BLISS COMPANY, Rolling Mill Division, Salem, Ohio

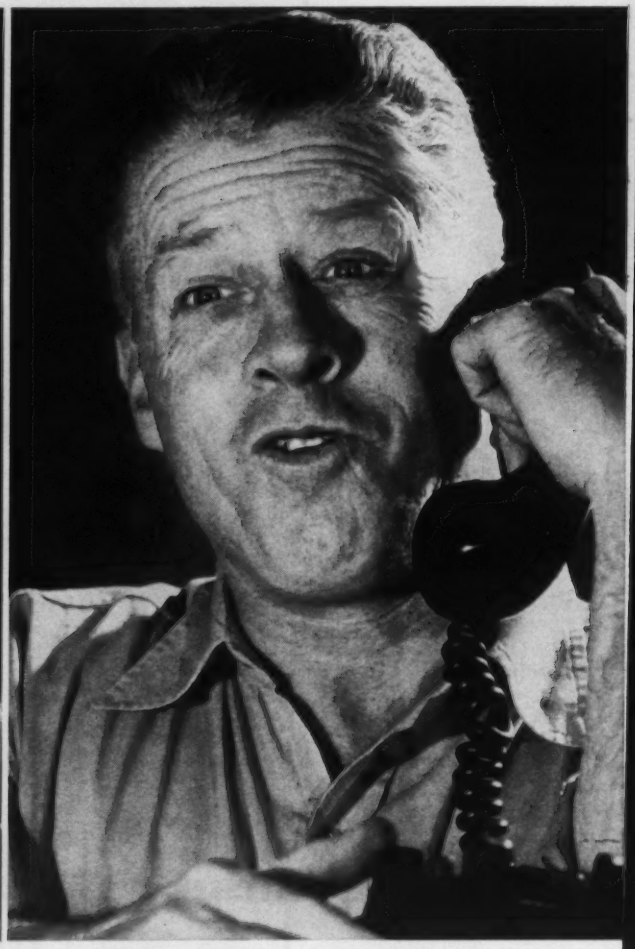
Rolling Mills • Mill Auxiliaries • Amerigear/Bliss Flexible Spindles

Subsidiary: The Matteson Equipment Company, Inc., Poland, Ohio

GOODYEAR

Why not buy hose





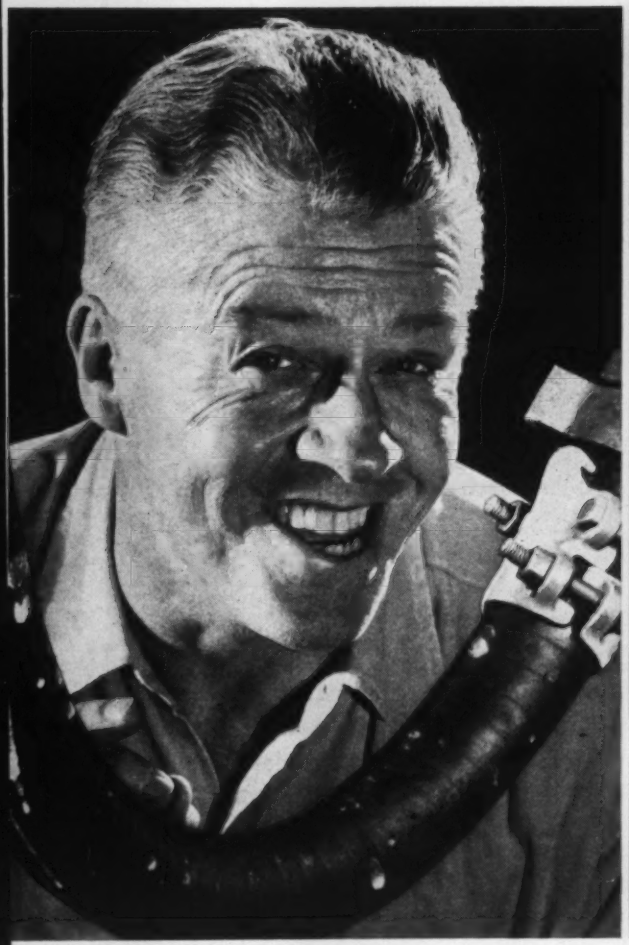
YOU GET THE RIGHT HOSE
(With the world's largest, most diversified line of industrial hose to choose from, *it's easy with Goodyear!)*

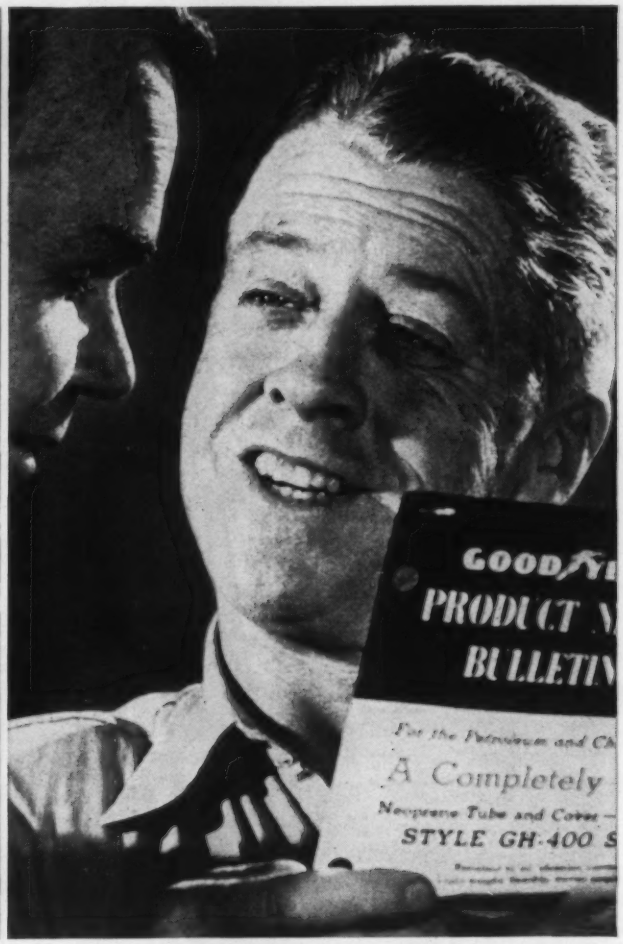
YOU GET FAST DELIVERIES
(With a big, nationwide network of stocking distributors to serve your needs, *it's easy with Goodyear!)*

For the right hose... at the right place... at your Goodyear Distributor... first in service

Lots of good things come from **GOOD** STEEL

the easy, Goodyear way?





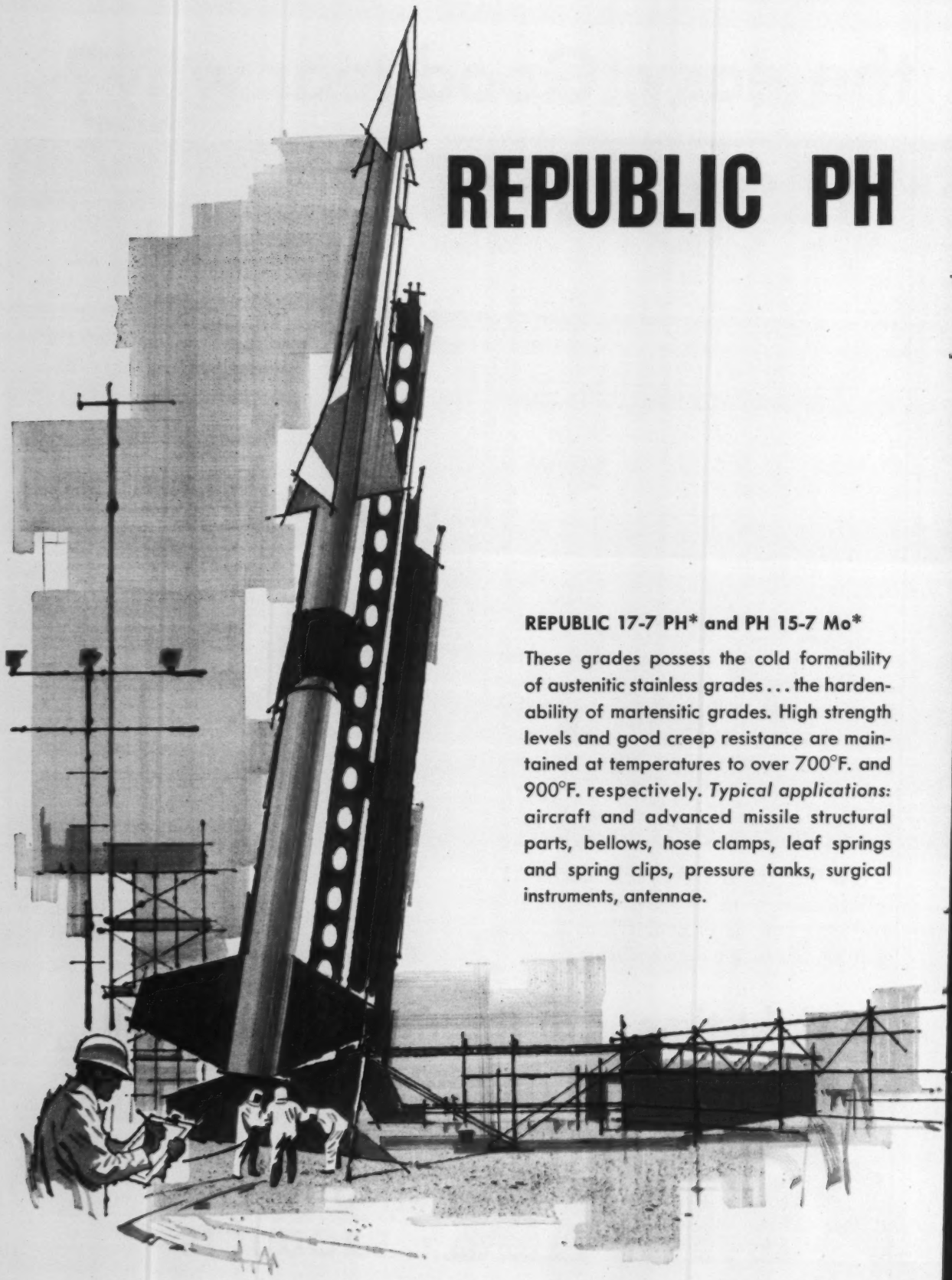
YOU GET UNMATCHED QUALITY
(With more than 50 years of pioneering research and development backing hose quality, *it's easy with Goodyear!)*

YOU GET EXPERT ADVICE
(With a trained hose expert like the G.T.M. – Goodyear Technical Man – always on call, *it's easy with Goodyear!)*

the right time... at the right price... call with all industrial rubber products

Or write Goodyear, Industrial Products Division, Akron 16, Ohio

GOODYEAR INDUSTRIAL PRODUCTS



REPUBLIC PH

REPUBLIC 17-7 PH* and PH 15-7 Mo*

These grades possess the cold formability of austenitic stainless grades . . . the hardenability of martensitic grades. High strength levels and good creep resistance are maintained at temperatures to over 700°F. and 900°F. respectively. *Typical applications:* aircraft and advanced missile structural parts, bellows, hose clamps, leaf springs and spring clips, pressure tanks, surgical instruments, antennae.

STAINLESS STEELS

BECAUSE THEY OFFER GREATER VERSATILITY, precipitation hardenable stainless steels broaden the already wide field of stainless steel applicability . . . Republic PH Stainless Steels available in the standard mill products effectively reduce fabricating costs. Higher developed strengths —*which remain high at elevated temperatures*— are coupled with the formability and corrosion-resistance of other stainless grades. Mail coupon for data.

REPUBLIC 17-4 PH*

Simple heat treatment after fabrication develops high strength levels without excessive distortion or scaling. Unlike most martensitic chromium types, Republic 17-4 PH* is welded without preheating or post annealing, thus resulting in lower fabricating costs. *Typical applications:* bearings, bolts, shafts, aircraft fittings, gears, splines, mandrels, pins, seats, and valves.

REPUBLIC A-286

In addition to excellent corrosion-resistance, this grade is designed to afford elevated temperature creep and stress rupture strength to over 1200°F. Because it is used on critical applications, majority of tonnage produced is processed from ingots that have been vacuum melted by Republic's consumable electrode process. *Typical applications:* jet engine and gas turbine components such as wheels, blades, frames, housings, afterburners, tail cone parts, and fasteners.

**Licensed under Pat. Nos. 2482096, 2505763 and Trade Mark of Licensor.*

REPUBLIC STEEL

Cleveland 1, Ohio

Where Steels are Made to Meet the Challenge of Acceleration

Strong, Modern, Dependable

REPUBLIC STEEL CORPORATION
DEPT. ST-1262
1441 REPUBLIC BUILDING • CLEVELAND 1, OHIO

Please send more information on:

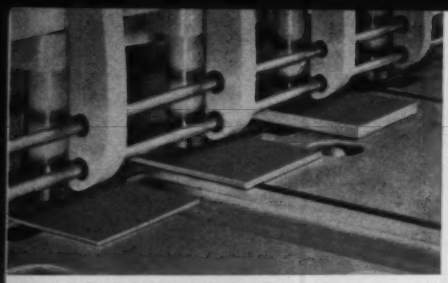
☐ Republic 17-7 PH and PH 15-7 Mo
☐ Republic 17-4 PH ☐ Republic A-286

Name_____ Title_____

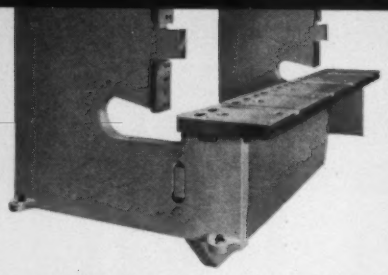
Company _____

Address_____

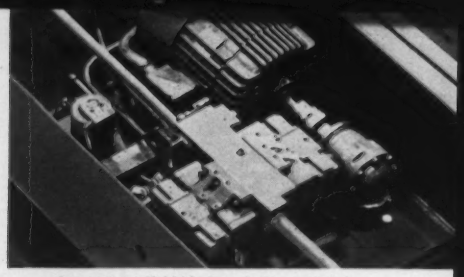
City_____ Zone____ State_____



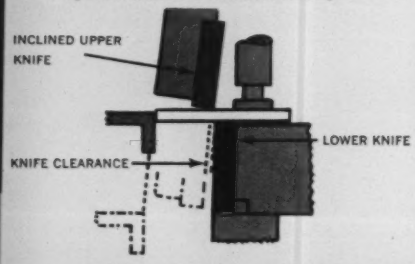
Hydraulic holddowns hold work securely.



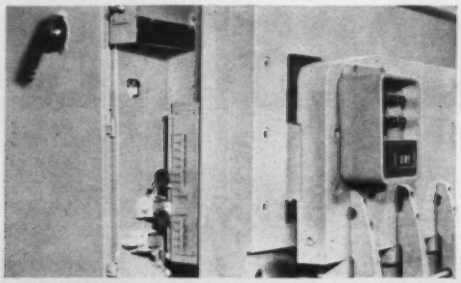
Interlocked construction eliminates load supporting welds.



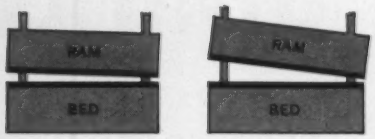
Compact manifold block replaces usual piping.



Inclined ram makes use of four edge knives practical.



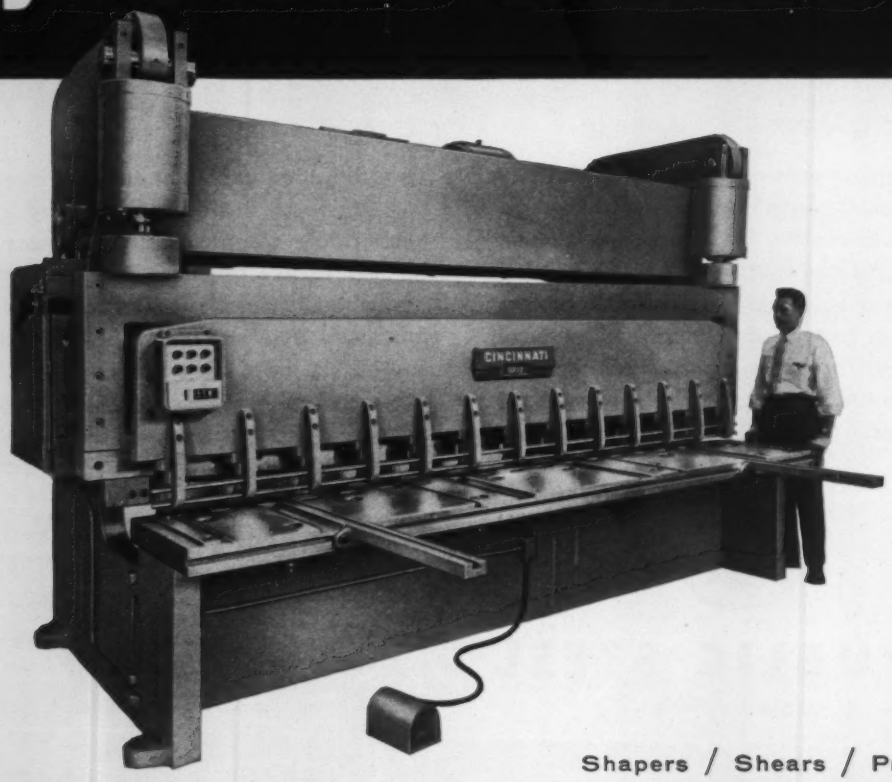
Centralized controls improve operator's productivity.



Adjustable rake gives you extra shearing capacity.

CINCINNATI®

hydraulic shears



Cincinnati Hydraulic Shears include in the standard price many features which cost extra on competitive shears. Several of these are shown above. Combined with an exceptional range of shearing capacity in one frame, they make any Cincinnati Hydraulic Shear a profitable investment. Request Bulletin HS-1 for complete details and features.

Shapers / Shears / Press Brakes

THE CINCINNATI SHAPER CO.

Cincinnati 11, Ohio, U.S.A.

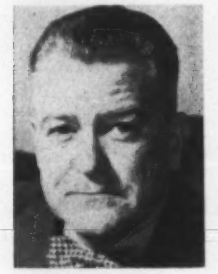
United Kingdom: The Cincinnati Shaper Co., Ltd., Glasgow, Scotland

STEEL
The Metalworking Weekly

Metalworking Week®

February 27, 1961

National Steel Elects New Chief Executive



Thomas E. Millsop (left) moves up to chairman and chief executive of National Steel Corp. He's succeeded as president by Paul Carnahan who has been chairman of Great Lakes Steel Corp., Detroit subsidiary of National Steel. George M. Humphrey, former secretary of the treasury, resigned as chairman of the steel firm but continues to serve as a member of the board and chairman of the executive committee—a post he has held continuously (except for his government service) since the company was formed in 1929.

1960 Was Good Year, Final Figures Show

The February *Survey of Current Business*, publication of the Commerce Department, will give these figures for the U. S. economy in 1960.

	Billions	% Change from '59
Gross national product	$503.2	+ 4.4%
Personal consumption spending	327.8	+ 4.5%
For durable goods	43.6	+ 0.5%
For nondurables	152.4	+ 3.3%
For services	131.7	+ 7.3%
Gross private domestic investment	72.8	+ 1.1%
For new construction	40.4	+ 0.2%
For producers' equipment	28.8	+12.0%
Total exports	26.5	+15.7%
Total imports	23.5	− 1.3%
Government purchases	99.7	+ 2.7%
Federal	52.4	− 1.7%
State & local	47.3	+ 7.7%

UAW Balks at NLRB Ruling

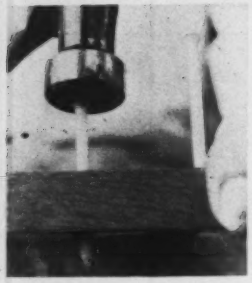
Look for the United Auto Workers to ask for a reconsideration of last week's ruling by the National Labor Relations Board that General Motors Corp. does not have to bargain on the point of agency shops in Indiana. The UAW complained that GM's refusal was unlawful. Indiana is one of 20 states with right-to-work laws that support agency shops. The ruling is seen as strengthening right-to-work laws.

Our Challenge from Nonmetallics

After too many years of passive resistance, metals have taken the offensive against nonmetallics. Metalmakers are trying to reverse a trend in which all major metals but aluminum have lost ground (on a per capita consumption basis) since 1950 while most nonmetals have gained. One battle plan for metals was explained to the Association of Industrial Advertisers in Chicago by Bay E. Estes Jr., vice president-marketing, U. S. Steel Corp. He urged metalworking to "market in depth"—to direct marketing effort at all people whose decisions, reactions, and activities

can affect the sale of a product, directly or indirectly. He warned: "It is no longer enough merely to sell one's wares in competition with similar wares of others. Perhaps it never was enough, but today such an approach falls short of being even the bare minimum." For tips on how to compete with nonmetals, see Page 77.

Plastic Nails Made from New Copolymer



Celanese Corp. of America has unveiled a new high strength (see photo) plastic that "promises to replace millions of pounds of metals and other plastics," the firm claims. Called Celcon, it is an acetal copolymer. "We estimate the total market for such high performance engineering plastics as Celcon will triple during the next three years and reach a level of 200 million lb per year by 1970," asserts Harold Blancke, the firm's chairman.

U. S. Will Send Grinding Machines to Russia

As indicated by STEEL (Feb. 6, p. 19), the Commerce Department has decided to permit the shipment of grinding machines to Russia, despite Defense Department objections. Commerce Secretary Hodges reportedly has taken the position that since like machines are available in Europe, blocking their export from the U. S. would only deprive U. S. firms of business. Involved are about 45 machines with an estimated value of $1.5 million.

Don't Just Write It; Do It, Burgess Challenges

"I fear in some instances the existence of beautifully bound copies of personnel procedures, policy statements, benefit brochures, conference documents, and the like may exceed the level and constancy of action needed to place into everyday practice all that these volumes desire," Carter L. Burgess, president, American Machine & Foundry Co., told the American Management Association personnel conference. He added: "I suggest that for the 1960s we not publish further volumes until we make certain that we are getting full mileage from the current shelf items."

Aluminum Exports Doubled in 1960

U. S. exports of crude aluminum totaled 570 million lb last year, more than double the 1959 total (242 million lb), the Commerce Department reports. Exports to the United Kingdom jumped 115 per cent to 236 million lb and exports to West Germany soared 302 per cent to 151 million lb. France, Yugoslavia, Japan, and the Netherlands also boosted their buying.

$250,000 Home Has Aluminum Frame

Near Detroit, a $250,000 home is being built with an all-aluminum structural frame. The owner is David N. Insley, president of Fisher-Insley Corp., a fabricator of Reynolds aluminum building products. Precut modular alu-

minum structurals which can be fabricated quickly make it possible to put together the entire structure with a hand wrench, a screw driver, bolts, and nuts.

Radio Telescope Readied for Installation

This giant new radio telescope is being readied for installation at Green Bank, W. Va. It will detect radio waves reaching the earth from distances up to 5 billion light years away. To support the 140 ft diameter antenna, E. W. Bliss Co. fabricated a massive aluminum superstructure from about 600,000 lb of aluminum components supplied by Alcoa, Kaiser, and Reynolds. The unit will be operated for the National Science Foundation by Associated Universities Inc., a nonprofit organization of nine Eastern universities.

French Criticize U. S. Equipment

Lack of uniformity in quality and performance of U. S. machine tools, agricultural equipment, electrical equipment, and other capital goods, as well as their high cost, are cited by French industrialists as deterrents to expansion of such U. S. exports in France. That's what Lawrence M. Weitzel, president, Mechanical Specialties Co., Los Angeles, reported on his return from a Commerce Department trade mission to France. After visiting with 150 French executives, he reports that "with improved equipment available from Germany, Switzerland, England, and its own plants at lower prices than those quoted by U. S. builders, I see slim hope for U. S. gains in exports of capital goods to France."

Get Depth on Your Bench, MIT Dean Urges

"In the years ahead, when creative energy will determine the life of the company, the most important general point in executive development is to produce a large enough corps of able alternatives from which selections can be made. We cannot see over the horizon, but we can produce a range of men who can meet the problem, still unseen, and we must create within an organization a system that will produce a broad range of choices." That's what Dean Howard W. Johnson of MIT's School of Industrial Management told the American Management Association's personnel conference. He added: "Each company must find a way to broaden its internal management selection process as opposed to the tendency to narrow it with the new specialties. Each firm must find ways to expose its best people to the broader demands of the business, not encourage all good men to specialize. We must move men on more quickly because they will tend to become obsolete earlier."

UAW Calls Unemployment Talk

Walter Reuther has called the United Auto Workers' first "Get America Back to Work" conference for Mar. 1 in Detroit. The meeting—first of

STEEL The Metalworking Weekly

February 27, 1961 Vol. 148 No. 9

CONTENTS

THE EDITOR'S VIEWS:
Challenge to Metals 63

WINDOWS OF WASHINGTON:
Army Pushes for Nike Zeus Program 74

MIRRORS OF MOTORDOM:
What's Ahead in Styling Trends? ..83

THE BUSINESS TREND:
Index Bucks Historical Trend 87

NEWS SECTION:
How Much Bounce in Spring Upturn? 67
Goldberg Panel Named 69
"How Reliable Are Your Venders?" 70
Tips for Winter Safety Programs ..72
Pearlitic Malleable Iron Sales Up ...73
Program for Management—Our Challenge from Nonmetallics 77
Degassing Unit Installed by Sharon 97

TECHNICAL SECTION:
Technical Outlook 111
Machine Overloads Can Be Avoided 112
Vacuum Aids Investment Casters ..114
Vibration Ends Part Deformation ..116
Thermoelectric Units in New Jobs 118
Progress in Steelmaking—British Steel Makes Gains 120
Back Hoe Used for Coil Handling ..123
Ryan Dotwelds Thick and Thin ..126
Stainless Ups Antibiotic Output ..129
Precision Upgrades Oil Seals 132
Ultrasonic Testing Aids Forger 133

MARKET SECTION:
Market Outlook 147
Complete Index to News and Prices 147
Constructional Steel Outlook Good .149
Some Export Prices Are Lowered ..151
1960 Steel Exports Under Imports .151
Stainless Output Short of '59's ...155
District Ingot Rates and Charts ...158
Scrap Index Rises on Light Buying 171
Nonferrous Metals—Record Sales Year Seen for Titanium 174

DEPARTMENTS & INFORMATION:
Servicenter 5
Editorial and Business Staffs 6
Calendar of Meetings 10
Metalworking Week 17
Metalworking Pulse 20
Men of Industry 91
New Products 135
New Literature 144
Advertising Index 179

©1961, The Penton Publishing Co.
All rights reserved.

Editorial Index available semiannually.

STEEL also indexed by Engineering Index, 29 W. 39th St., New York 18, N. Y.

three—is aimed at developing ways to meet needs of the unemployed and to strengthen consumer purchasing power. Mr. Reuther says auto cutbacks have affected more than 800,000 workers. He says more than 105,000 workers have lost at least one week's work since Feb. 1. He also brands "exaggerated" reports that workers at Chrysler's Nine Mile Stamping Plant are considering pulling out of the union. The workers are circulating petitions because they say they're being bumped from jobs by workers laid off at other Chrysler plants. Meanwhile, *Ward's Automotive Reports* says February car production is at the lowest level since 1952.

Ray Gun Transmits Voices

Words spoken into this gun are converted into infrared beams, then transmitted silently and secretly to another device (up to 20 miles away) that converts the message back into sound. Developed by Minneapolis-Honeywell Regulator Co., the Maxsecom system is for use where immunity to interception and jamming are necessary.

Straws in the Wind

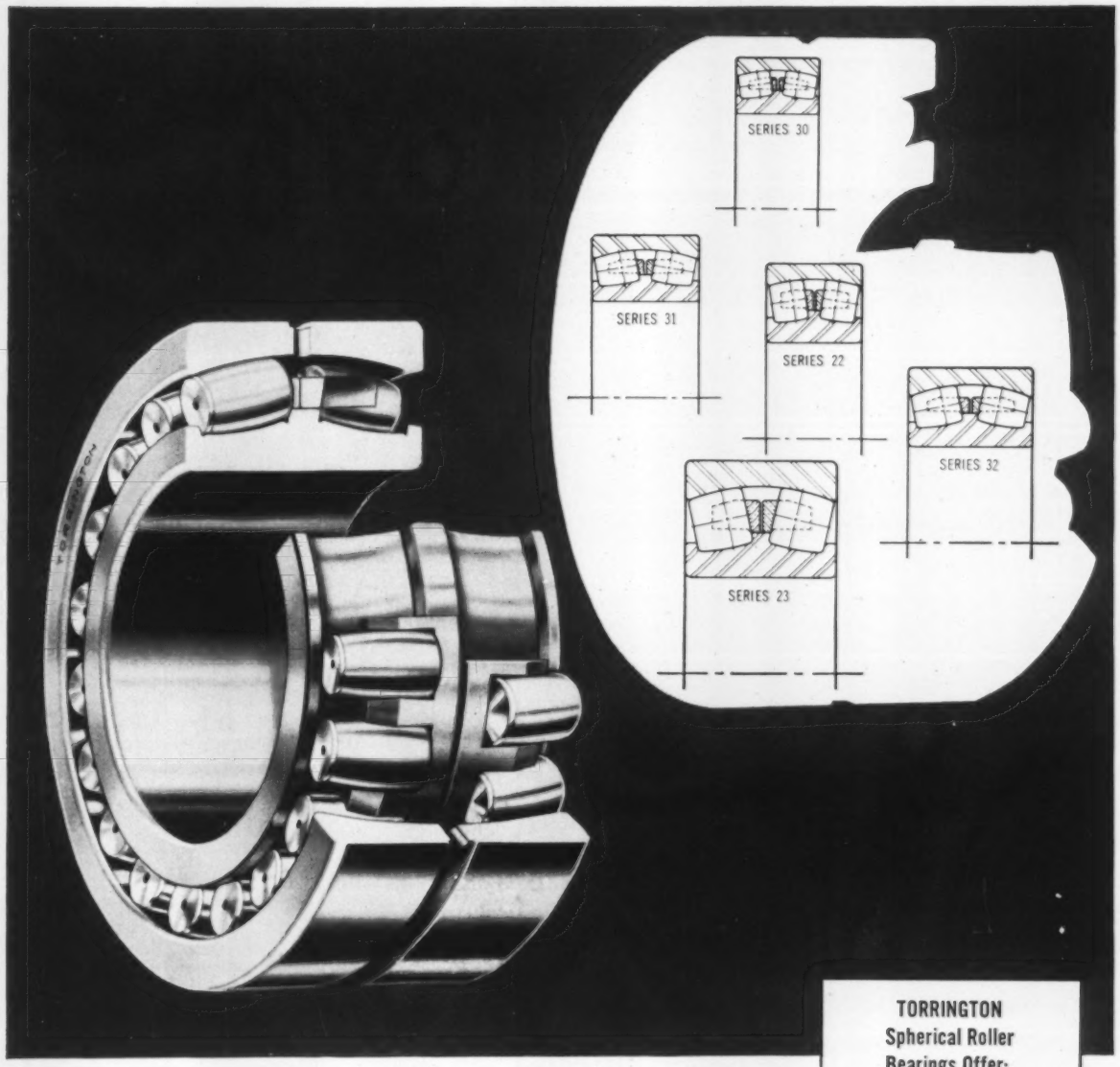
Sales and new orders for durable goods manufacturers declined 2 per cent last month, the Commerce Department reports . . . Koppers Co. says it does not believe its acquisition of Thomas Flexible Coupling Co. is in violation of the Clayton antitrust law, as Attorney General Robert Kennedy has charged . . . Chrysler Corp. says its car sales are being hurt by the adverse publicity the firm has earned during the last year; it is making a survey to measure the effects of the publicity . . . General Motors Corp. employees earned $5 million for their suggestions during 1960 . . . At Maytag Co., 93 per cent of eligible supervisors submitted an average of eight cost reduction ideas last year and the firm saved an average of $2290 for each idea adopted . . . General Electric Co. has reduced prices 41 per cent on three models of silicon unijunction transistors . . . An equipment firm has developed a drilling rig capable of boring a hole on the surface of the moon, says the American Petroleum Institute.

Metalworking Pulse

The Business Trend: STEEL's industrial production index is bucking the historical trend of a downward slide in the first quarter. For the second consecutive week, the index held at 147, only 3 points under the January peak. **Autos:** Production will increase as builders step up schedules following last week's sharp cutbacks. **Steel:** The uptrend in ingot output continues with tonnage reaching the highest level since last June.

- **INDUSTRIAL PRODUCTION INDEX**
  (1947-49=100)
  Week ended Feb. 18 .... 147†
  Year ago 180
  Details on Page 87
- **PASSENGER CAR OUTPUT (UNITS)**
  Week ended Feb. 25 .. 95,000*
  Year ago 153,501
  Details on Page 84
- **STEEL INGOT OUTPUT (TONS)**
  Week ended Feb. 25 1,590,000*
  Week ago 1,582,000
  Details on Page 158

†Preliminary. *Estimated.



There's a Torrington Spherical Roller Bearing for your application

Bearings matched *exactly* to the job pay off in better performance, longer life, greater reliability. That's why it pays to specify carefully. And that's why it pays to choose Torrington Spherical Roller Bearings.

Whatever your space limitations or capacity requirements, the five series of Torrington Spherical Roller Bearings provide the right bearing for virtually every industrial application. You can design for straight bore or tapered bore with adapter. You can benefit from extra features such as lubrication groove and oil holes, or selected outside diameters.

Your use of Torrington Spherical Roller Bearings will assure exceptional operation and longer bearing life under the toughest conditions. They're made to Torrington's own uncompromising standards—the highest in the field of anti-friction engineering—by the manufacturer of every basic type of anti-friction bearing.

TORRINGTON Spherical Roller Bearings Offer:

- conformity of rollers to raceways
- integral center guide flange for stability
- positive roller guidance
- land-riding bronze cages
- maximum radial and thrust capacity
- controlled internal clearance
- electronically selected rollers
- inherent self-alignment
- even load distribution
- long, dependable service life

Send for new Torrington Spherical Roller Bearing Catalog #258

progress through precision **TORRINGTON BEARINGS**

THE TORRINGTON COMPANY South Bend 21, Indiana • Torrington, Conn.

Roll forming shapes like these is like automating a stamping plant...

"We think of these bins full of roll formed samples as *idea material*," Lou Colleran, Vice President-Sales explains. "Roll forming has limitations, of course, but it cuts out a lot of individual handling, punching, notching, drilling and embossing operations. *Not only can we roll a complex shape—we can pre-notch, pre-punch, and roll in lines, designs and decorations, all at the same time, in a single efficient forming operation.*" This, briefly, is the story of Roll Formed Products Co.

They work mostly with steel which is supplied by J&L in a variety of metallurgical grades, gauges and widths to meet the needs of a long list of customers.

Manufacturers of appliances, automobile parts, hardware, office furniture, metal partitions, electrical apparatus, business machines, shelving, and construction materials all save time and money by utilizing roll formed shapes.

Steel is basic to virtually all these roll formed products, and J&L consistently supplies the right steel in the right quantity at the right time. J&L can do the same for you.

Ask your J&L representative to give you the facts.

J&L STEEL

Jones & Laughlin Steel Corporation
3 Gateway Center, Pittsburgh 30, Pennsylvania

This Steelmark identifies products made of steel. Place this mark on your products. And—look for it when you buy.

Steel

▲ **Thousands of roll formed shapes** are created by Roll Formed Products Co., Youngstown, Ohio, for use by appliance, automobile, hardware, office furniture, and construction materials manufacturers, and many others.

Roll Forming is a highly specialized art. ▶ In one continuous operation, the coil of steel passes through a series of rolls, is formed, notched, punched, cut to length, then stacked for transport to loading and shipping area.

precise tubing

In a wide selection of seamless and welded and drawn up to 1" O. D.

- Stainless Steel . . . Nickel . . . Nickel Alloys . . . Super and Exotic Alloys
- Glass-to-Metal Sealing Alloys
- Clad Metals and
- Composite Wires . . . Base and Precious Metals

Write for Bulletin No. 12

BISHOP

Tubular Products Division **J. BISHOP & CO.** *platinum works* 30 KING STREET, MALVERN, PENNA.

A JOHNSON MATTHEY ASSOCIATE "METALS FOR PRECISION AND PERFORMANCE"

OFFICES: NEW YORK • CHICAGO • ATLANTA • HOUSTON • LOS ANGELES

WE ARE AT WAR!

No Paul Revere to warn us. But... America is at war. Economic war. A war of goods, figures, production quotas, exports, imports, markets, trade balances, foreign exchange. A war of technologies, skills, ideas... of men, methods, machines. A war America must win. The stakes are high. The challenge, clear, the hour, late. But industry still can choose. Modernize and go forward. Or... stagnate and decline.

At Pratt & Whitney **new** ideas, **new** processes and **new** equipment are producing America's finest machine tools, cutting tools and gages—products that can cut costs, increase production, make your product more competitive, salable, profitable.

Pratt & Whitney

HEADQUARTERS FOR AMERICA'S WAR AGAINST OBSOLESCENCE

machine tools / cutting tools / gages

A MAJOR INDUSTRIAL COMPONENT OF **FAIRBANKS WHITNEY CORPORATION**

FIGHT OBSOLESCENCE... WITH P&W'S "WEAPONS" FOR GREATER PRODUCTIVITY AND PROFIT

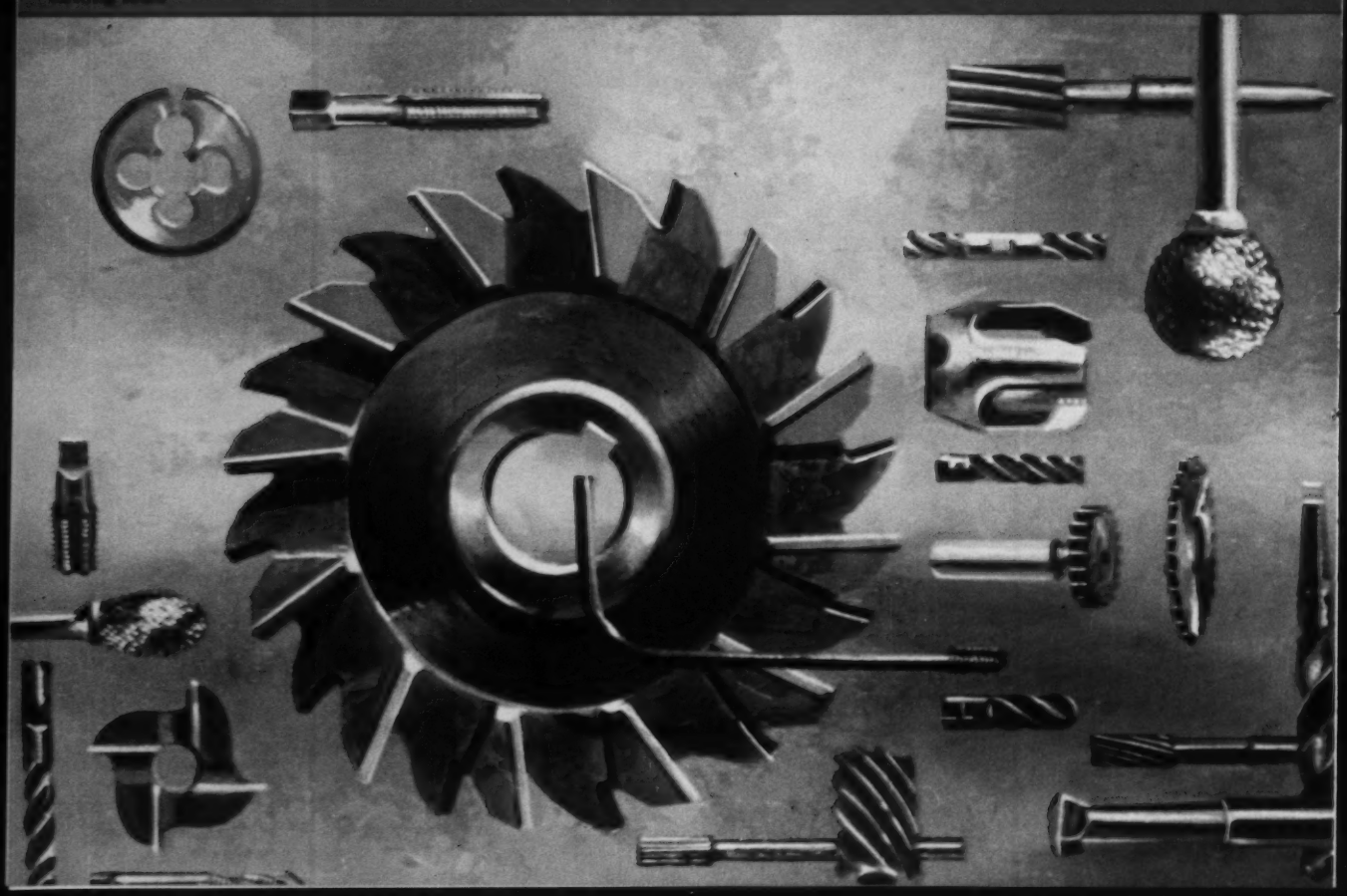
Bring your machinery or tooling modernization problem to Pratt & Whitney's "cost-cutting-conscious" sales engineers at our permanent machine and tool exhibition . . . Centennial Hall, West Hartford, Connecticut, "Headquarters for America's War Against Obsolescence."

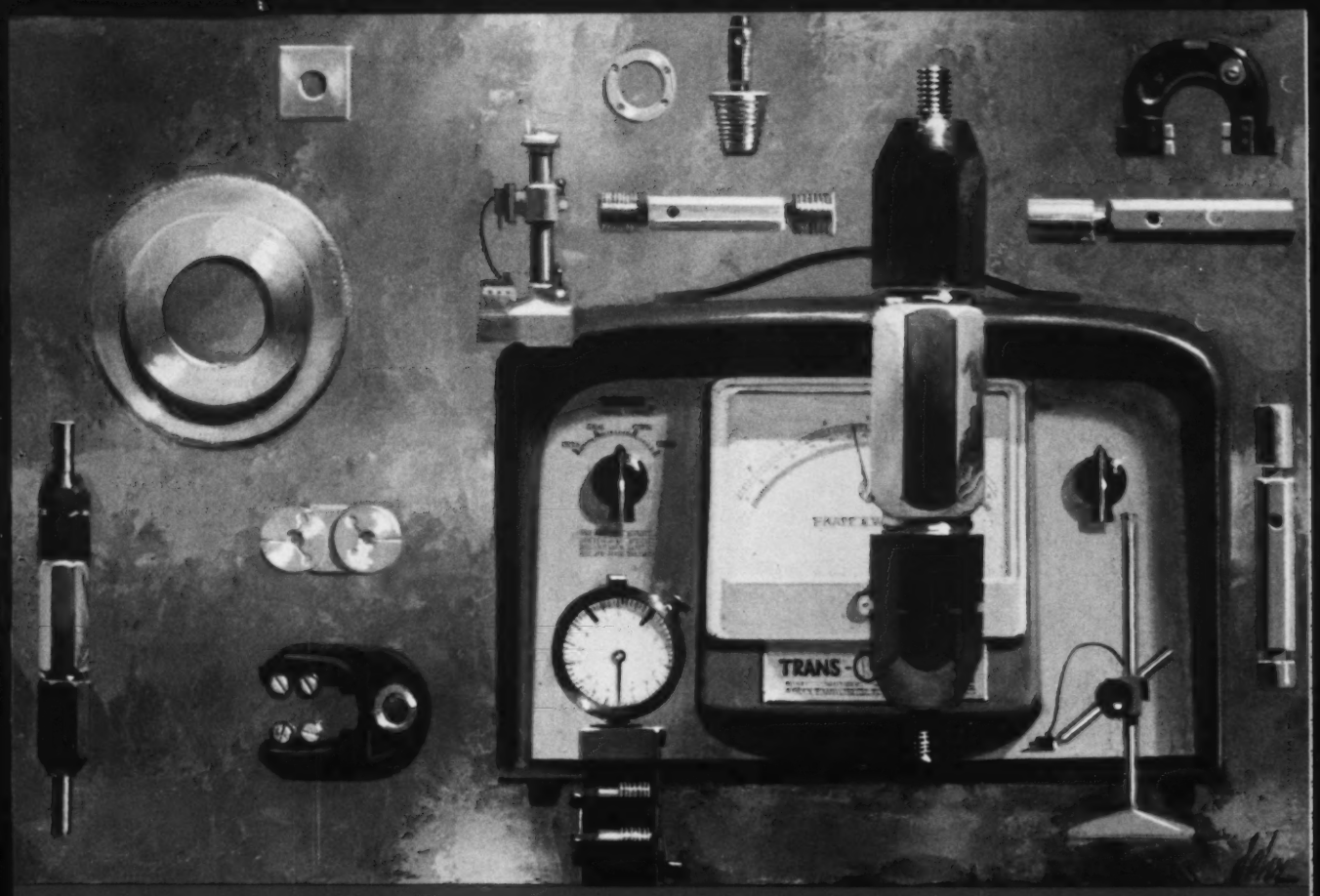
P&W MACHINE TOOLS Producing prototypes, dies, large or small lots of production parts? Ultra-precision locating (to "tenths" accuracy)? Boring, profile-milling (with or without masters)? All these and countless other problems can be solved with P&W machine tools at production line speed, efficiency and economy. Machines such as the world-famous **P&W KELLER,® P&W JIG BORER, P&W ROTARY TABLE** and **P&W POTTER & JOHNSTON AUTOMATIC TURRET LATHE** are available with manual or numerical controls in a variety of models to fit your needs. **P&W** can also supply the **MAGNETRACE PROFILER, SIM LATHE, INNOCENTI-MITSUBISHI MILL** and the **DIAFORM WHEEL FORMING ATTACHMENT** . . . high grade performers all. For more information or expert advice ask your **P&W** representative.

P&W CUTTING TOOLS A machine tool's performance is no better than the cutting tool it drives. You can be sure your cutting tools will deliver the full dollar value of your machine if they're made by Pratt & Whitney. Incorporating the latest in tool geometry, metallurgy, and manufacturing techniques, **P&W** cutters pay off in increased production, higher work quality, lower final tooling costs. Investigate our complete line of **DRILLS, TAPS, DIES, MILLING CUTTERS, REAMERS, BURRS** and **END MILLS** . . . in HSS and solid carbide. All are available now through selected industrial distributors in your area. For full information or special-problem help, call on a **P&W** factory-trained sales-service engineer.

P&W GAGES More than ever, production efficiency depends on fast, precise, economical gaging. **P&W** supplies all types of gaging equipment. Thus, you can choose those that do your job at lowest cost . . . from the most intricate tape-controlled **INSTRUMENT GAGES** to simple **CONVENTIONAL GAGES.** Types include **PLUG, RING, THREAD** and **SNAP GAGES, INTERNAL** and **EXTERNAL COMPARATORS,** and **PRECISION GAGE BLOCKS** . . . all available through industrial distributors. The exclusive series of **AIR-O-LIMIT,® SIGMATIC,® TRANS-O-LIMIT®** and **DATA-LIMIT®** gages and the famous **"FLYING MIKE" CONTINUOUS GAGE** are available from your **P&W** representative. Bring your gaging problem to him.

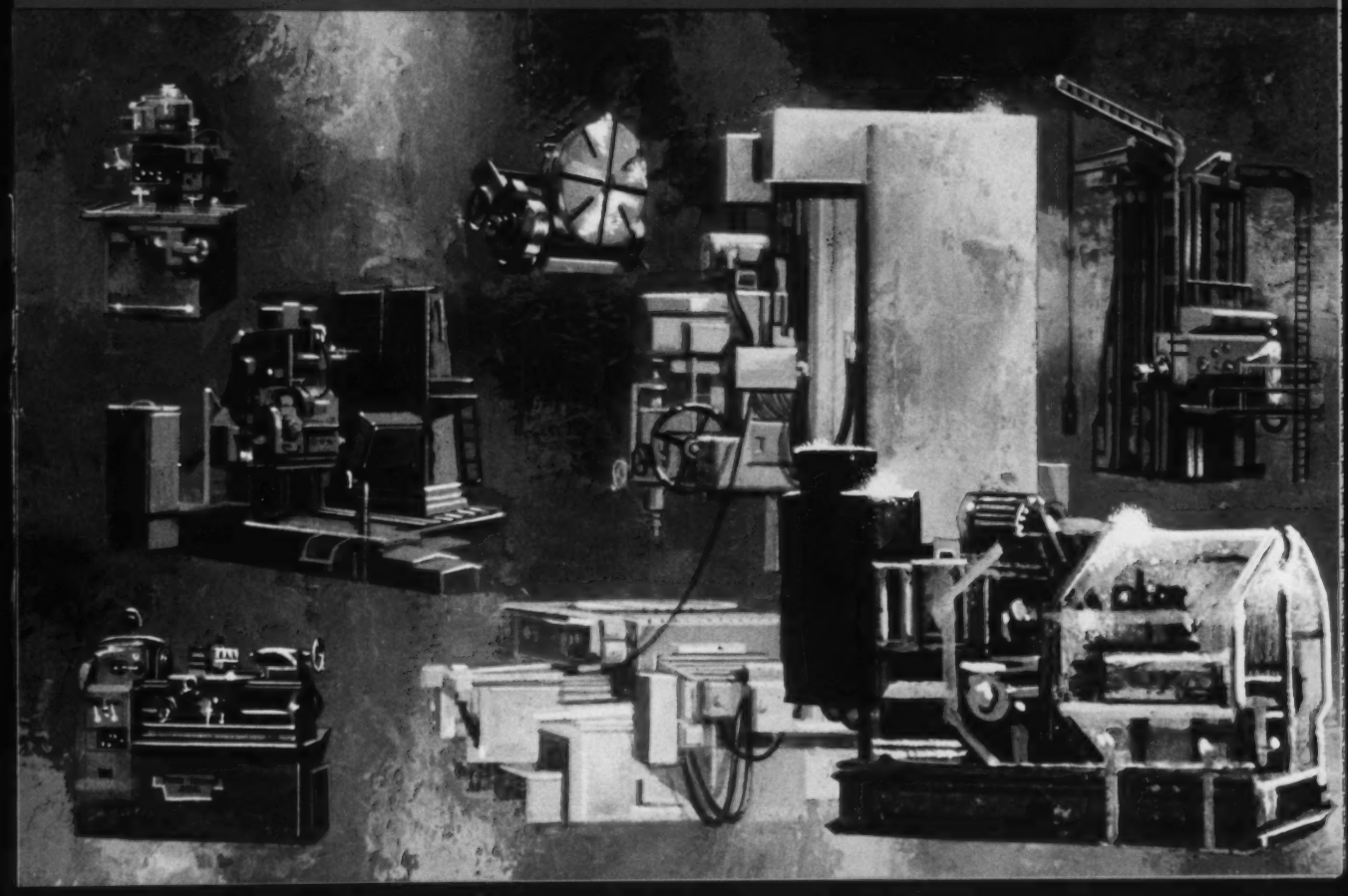
cutting tools





gages

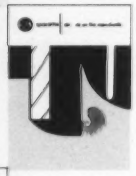
machine tools



These are some of the many detailed bulletins available on world famous Pratt & Whitney machine tools, cutting tools and gages.

THE P&W, POTTER & JOHNSTON® AUTOMATIC TURRET LATHE is the fastest, most efficient automatic turning machine on the market today. The addition of inexpensive tape control further reduces setup and operating times and assures "management control" over production rate . . . thus providing predictable profits. Write for Bulletin No. A11.

THE P&W SIM LATHE is a production machine capable of taking the heaviest cuts in small and medium lot turning operations—as well as the most delicate cuts on frail work-pieces—to extremely close tolerances . . . all ECONOMICALLY. Write for Bulletin No. A52.



THE NEW P&W MAGNETRACE® PROFILER will perform tracer controlled, profile milling operations previously thought impossible. Extremely fast (up to 80" per minute) and accurate (a stylus deflection of only .0002" will activate the drive mechanism), the Magnetrace must be seen in operation to be believed. Write for Bulletin No. A51 or visit Centennial Hall to see it in action.

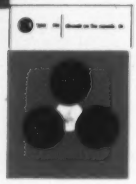
PRATT & WHITNEY TAPS are the finest available anywhere. They're made of the finest materials, on the best equipment, with the latest manufacturing techniques and tool geometry know-how. They insure the highest number of tapped holes per tool. Write for Bulletin No. B11.

PRATT & WHITNEY END MILLS feature advanced tool geometry for more cutting edge rigidity; and exceptionally sharp, smooth, cutting teeth. This results in longer tool life and better work finishes. Write for Bulletin No. B21.

PRATT & WHITNEY BLUE HELIX® DRILLS – new with P&W – are made to the same standards of quality as the famous Blue Helix Reamers which have a world-wide reputation for quality. Made from the finest high speed steel to proven cutting tool geometry, they are expertly heat treated and specially surface hardened. This lengthens useful life, boosts accuracy and reduces chip abrasion. Write for Bulletin No. B61.

PRATT & WHITNEY TRANS-O-LIMIT® COMPARATORS are an entirely new line of completely transistorized, precision measuring instruments. The Trans-O-Limit Cabinet, used in conjunction with the Trans-O-Limit Height Gage, External Comparator, Cartridge Unit, or Snap Gage, provides the ultimate in gaging stability and precision. Write for Bulletin No. D11.

PRATT & WHITNEY HOKE® AND U.S.A. PRECISION GAGE BLOCKS are available in both steel and solid carbide. Accuracy is unconditionally guaranteed within a few millionths of an inch. They're used individually or wrung together in stacks, to produce any desired measurement in calibrating a wide variety of working gages. Write for Bulletin No. C11.



PRATT & WHITNEY TRI-ROLL® THREAD ROLL COMPARATORS provide fast, accurate dimensional analysis of threads, to insure acceptance of only those screws or fasteners that meet your standards. They check taper, out-of-roundness, deviations in lead and angle, and low limit pitch diameter. Write for Bulletin No. C21.

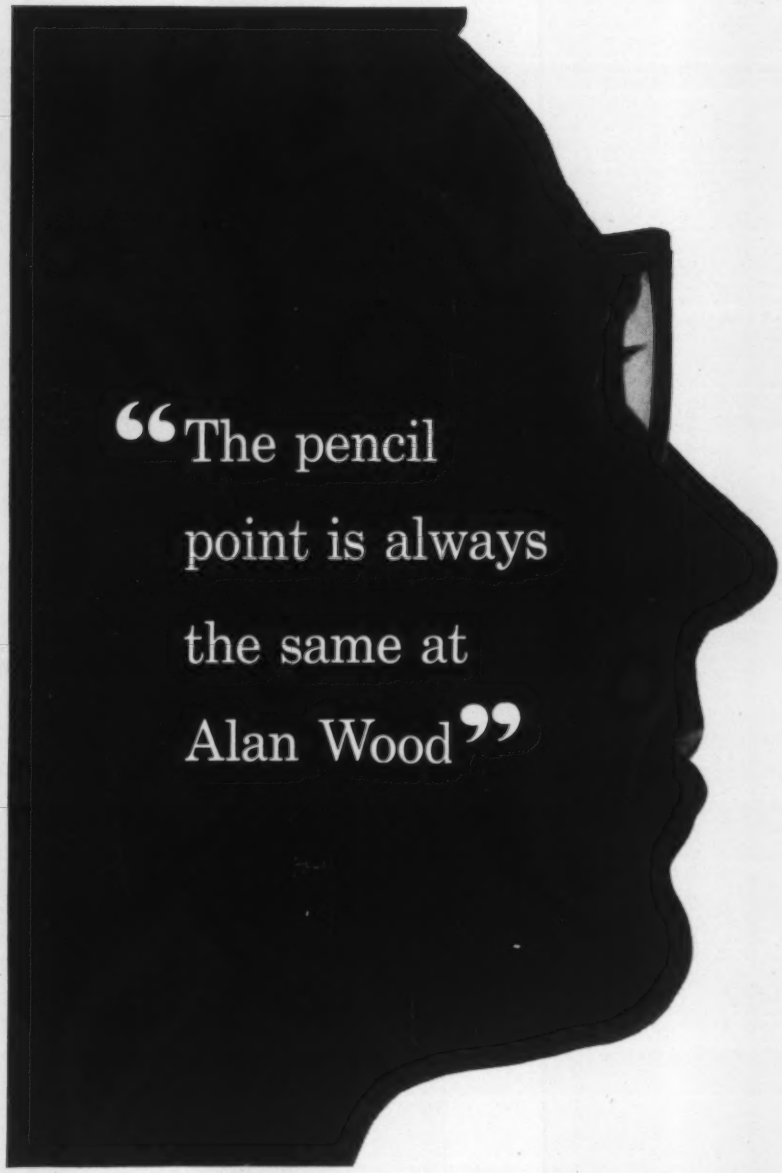
Pratt & Whitney

HEADQUARTERS FOR AMERICA'S WAR AGAINST OBSOLESCENCE

machine tools / cutting tools / gages

A MAJOR INDUSTRIAL COMPONENT OF **FAIRBANKS WHITNEY CORPORATION**

PRATT & WHITNEY COMPANY, INCORPORATED, CHARTER OAK BOULEVARD, WEST HARTFORD, CONNECTICUT



"Doing business with Alan Wood, we never have to worry about variations in pricing policy. Whether steel is short or plentiful, the pencil point is always the same."

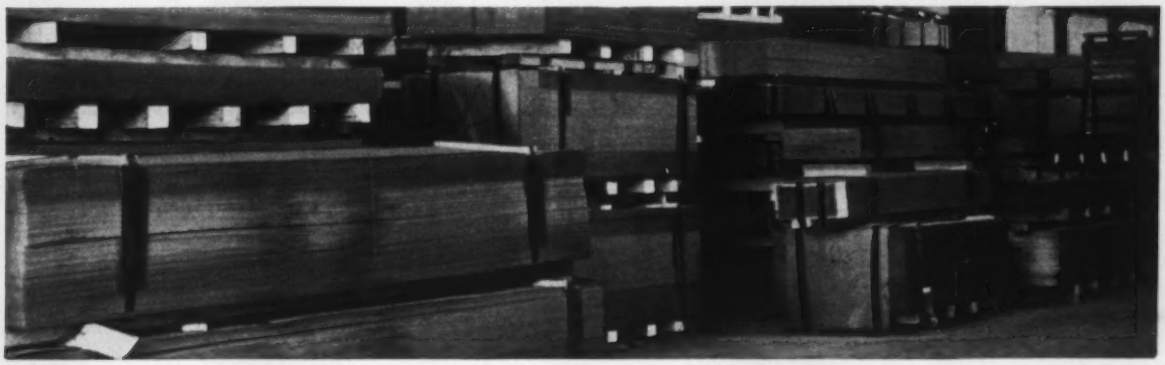
That's the way one Alan Wood customer said it, and we appreciate the acknowledgement. We do believe in consistent pricing policy. Moreover, Alan Wood is geared to give your order prompt attention without red tape delays. Your quality goes up, your costs and rejects go down, when you use dependable Alan Wood plate, sheet and strip.

When your metallurgical requirements need speedy, reliable analysis, ask for an Alan Wood study. Your Alan Wood representative is always available, ready to help.

ALAN WOOD STEEL COMPANY

Conshohocken, Pa. • STEEL PRODUCERS WITH THE CUSTOMER IN MIND

DISTRICT OFFICES AND REPRESENTATIVES: Philadelphia • New York • Los Angeles • Boston • Atlanta Cincinnati • Cleveland • Detroit • Houston • Pittsburgh • Richmond • St. Paul • San Francisco • Seattle Montreal, Toronto and Vancouver, Canada: A. C. Leslie & Co., Limited



Cutler-Hammer cuts costs

In 1951, following mechanical improvements on the hydraulic system powering its plastic molding presses, Cutler-Hammer found that oxidation and emulsification of a low-grade hydraulic oil resulted in sticking valves, high oil consumption, costly replacement of worn main ram packings. Change to a premium Mobil oil and installation of a centrifuge for water and contamination removal reduced ram packing wear by 75% and resulted in a reduction in valve sticking and oil consumption. After 9 years, with periodic oil analyses by Mobil, the original fluid fill is still in service. Savings: $5,484 in 1959 alone.

Mobil

with Mobil— saves $13,300!

Leading manufacturer of engineered electrical systems benefits from Mobil Correct Lubrication, realizes economies in wide range of operations, saves $13,300 in one year alone

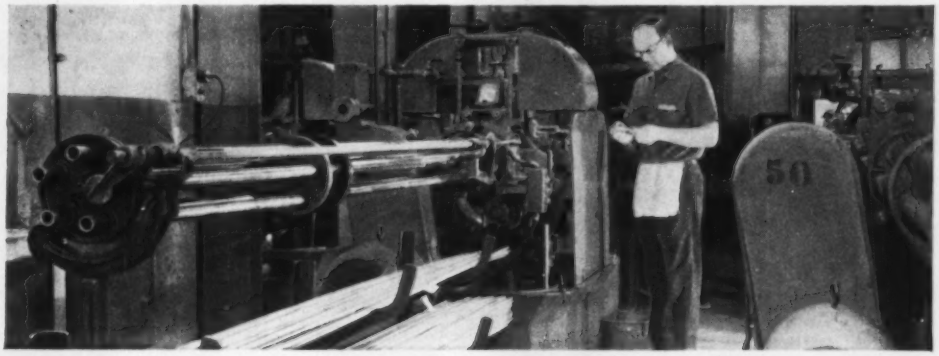
A pioneer in the production of electric controls, Cutler-Hammer, Inc., has for many years relied on a Mobil Program of Correct Lubrication for its several Milwaukee plants. The Mobil Program has consistently brought benefits to Cutler-Hammer—in terms of increased production efficiencies and maintenance dollar savings.

Working in close liaison with Cutler-Hammer technical personnel, Mobil Engineers have made recommendations and suggestions in many areas where lubrication is a factor. These recommendations—a few of which are itemized below—resulted in a saving of $13,300 to Cutler-Hammer in 1959.

Your plant may profit from a Mobil Program too. For further information, call your Mobil Representative. Or write, Mobil Oil Company, 150 East 42nd Street, New York 17, New York.

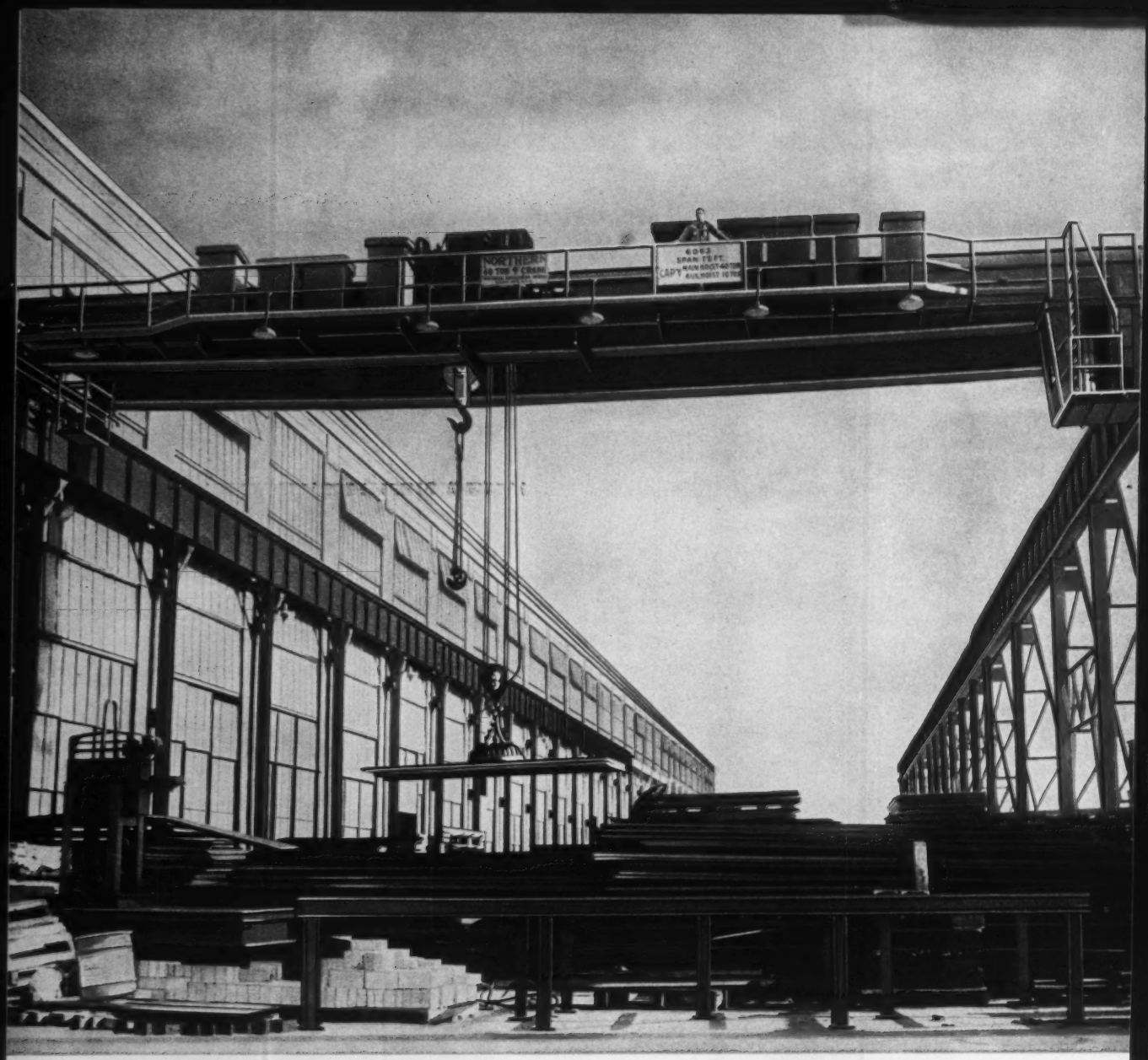
To guide lubrication personnel in performing required services, Mobil developed complete lubrication charts for machines at Cutler-Hammer, worked out oiler routes and schedules, and recommended use of time-saving lubrication cart. Increased efficiency permitted reassignment of a maintenance man, reduced other overhead, saved $7,452 in 1959—principally in the Press Department.

A Mobil recommendation covering quantity deliveries of oils and greases proved advantageous to Cutler-Hammer. After studying Cutler-Hammer's requirements, Mobil recommended that lubricant purchases be consolidated to permit carload deliveries beginning in 1955. These carload deliveries made possible discount savings which last year amounted to $364.



In Cutler-Hammer's screw machine department, a central cutting oil system serves many machines. Contamination of cutting fluid by lubricating oil frequently reduced machining efficiency to the point where tolerances, tool wear, poor finishes and excessive smoking became serious problems. Mobil Engineers have helped greatly to reduce these problems by periodically analyzing cutting oil characteristics and after each analysis, prescribing corrective action to restore maximum machining efficiency.

Correct Lubrication



NORTHERN CRANES for heavy, continuous service in steel storage yards

This 40/10-ton, 75-foot span heavy duty magnet crane was designed for extremely severe service, and was equipped with newly developed electrical control equipment to provide maximum handling efficiency.

The above installation, in a large electrical equipment manufacturing plant, is typical of many similar Northern Crane installations in steel mills, fabricating plants, and like service in heavy industry.

Northern heavy duty cranes are designed and built to meet the most exacting requirements, providing for continuous service under severe operating conditions, handling maximum loads, and with high impact allowances. Mill type motors and controls provide highest electrical performance.

MATERIAL HANDLING EQUIPMENT BY NORTHERN

Sales representatives in all principal cities.

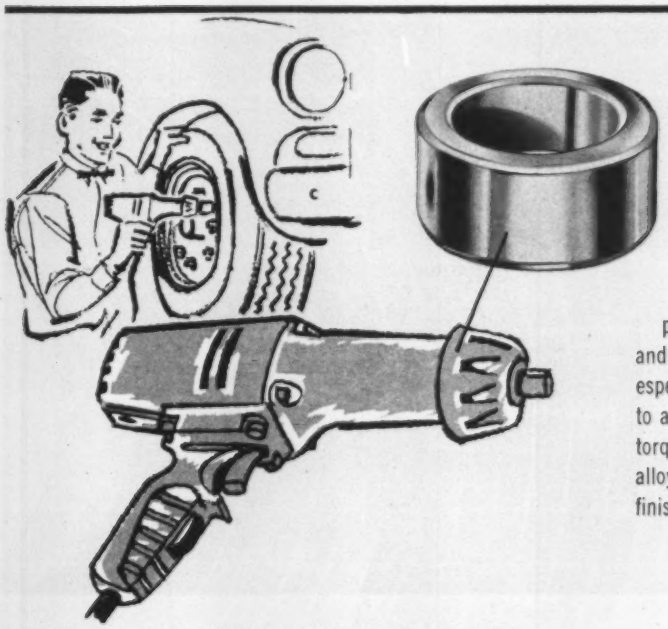
NORTHERN ENGINEERING WORKS
210 CHENE ST., DETROIT 7, MICH.

SE-2006

look overhead . . . see "NORTHERN"

600 SERIES

THE FORGEABLE BEARING ALLOYS THAT STAND UP ON THE REALLY TOUGH JOBS!

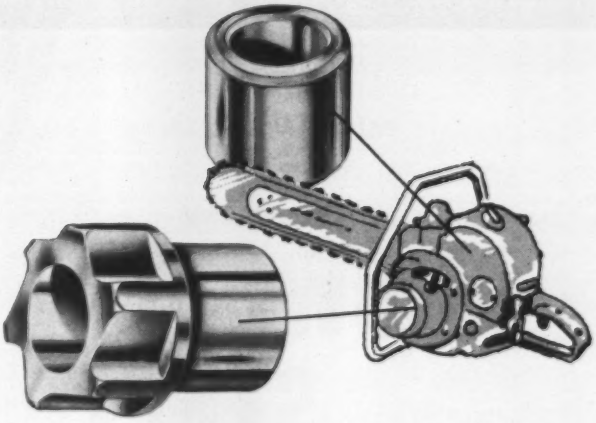


600 ALLOY NOSE BEARING WITHSTANDS THE PUNISHING SHOCK LOADS OF AN IMPACT WRENCH

This heavy-duty impact wrench takes the rigorous punishment of hard industrial use right on the nose . . . and right on the 600 Series nose bearing. This bearing was especially chosen by the manufacturer because of its ability to absorb a range of 1600 to 1800 impacts per minute at a torque of from 0 to 250 foot pounds. By specifying 600 bearing alloy, the manufacturer gets superior performance from his finished product.

600 ALLOY RATCHET AND DRIVE GEAR BEARING TAKES THE TERRIFIC POUNDING OF A HIGH POWERED CHAIN SAW

Professional woodcutters give chain saws a rough time for hours on end, all year round, and these rugged saws must be built to take punishment. With chain speeds up to 3000 feet per minute, the ratchet and drive gear bearings, for example, must have a very high strength, hardness and good resistance to wear with minimum lubrication. That's why 600 Series Alloy was specified for both parts . . . the ratchet is a forging and the bearing was produced from 600 Series rod.



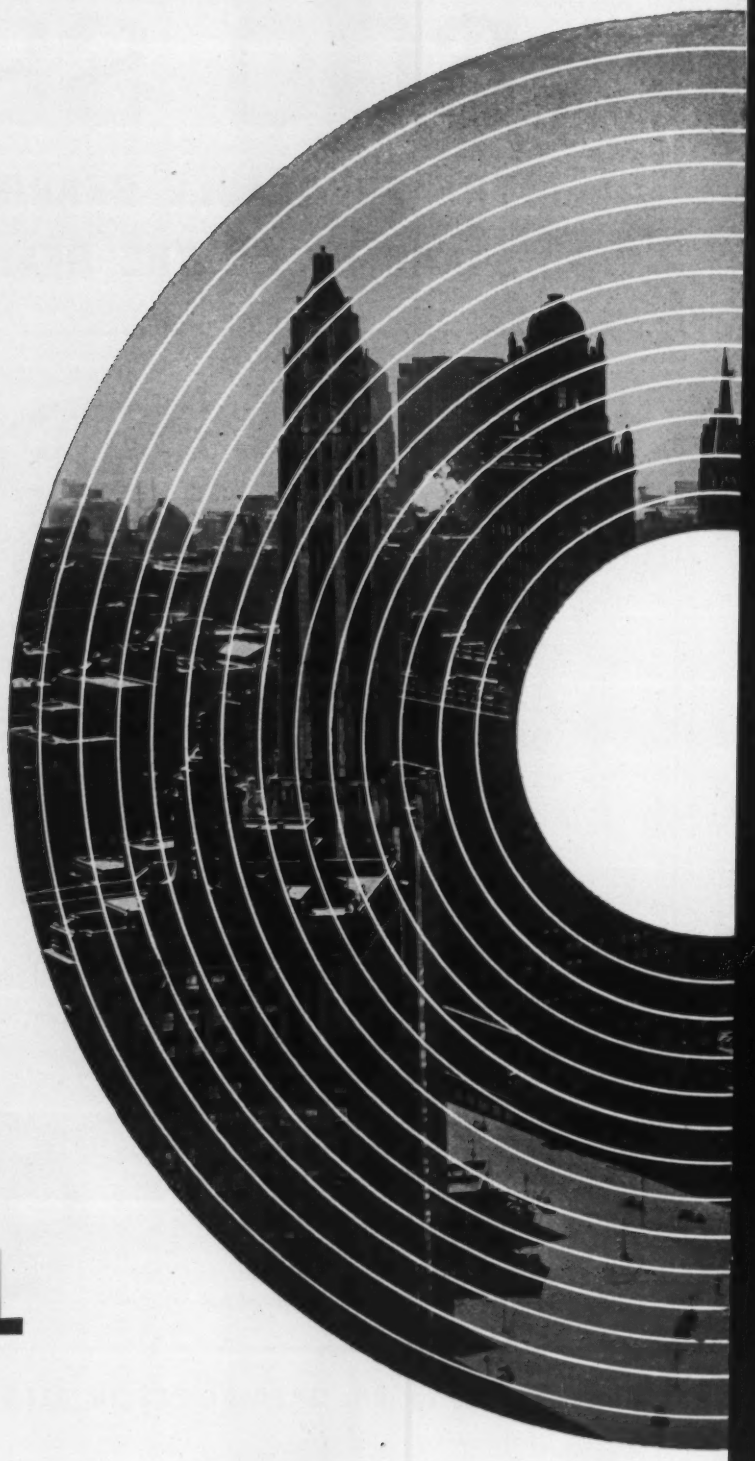
MUELLER BRASS CO. SPECIALIZES IN ALLOYS FOR DIFFICULT APPLICATIONS

For complete engineering data, write today for Special Alloys Kit No. 13.

The alloys available from the Mueller Brass Co. range from those having high hardness and wear properties, to alloys that must possess excellent electrical conductivity, and ones that must have free-machining properties. Let our engineers help you select the alloy best suited to your exact application.

MUELLER BRASS CO. PORT HURON 26, MICHIGAN

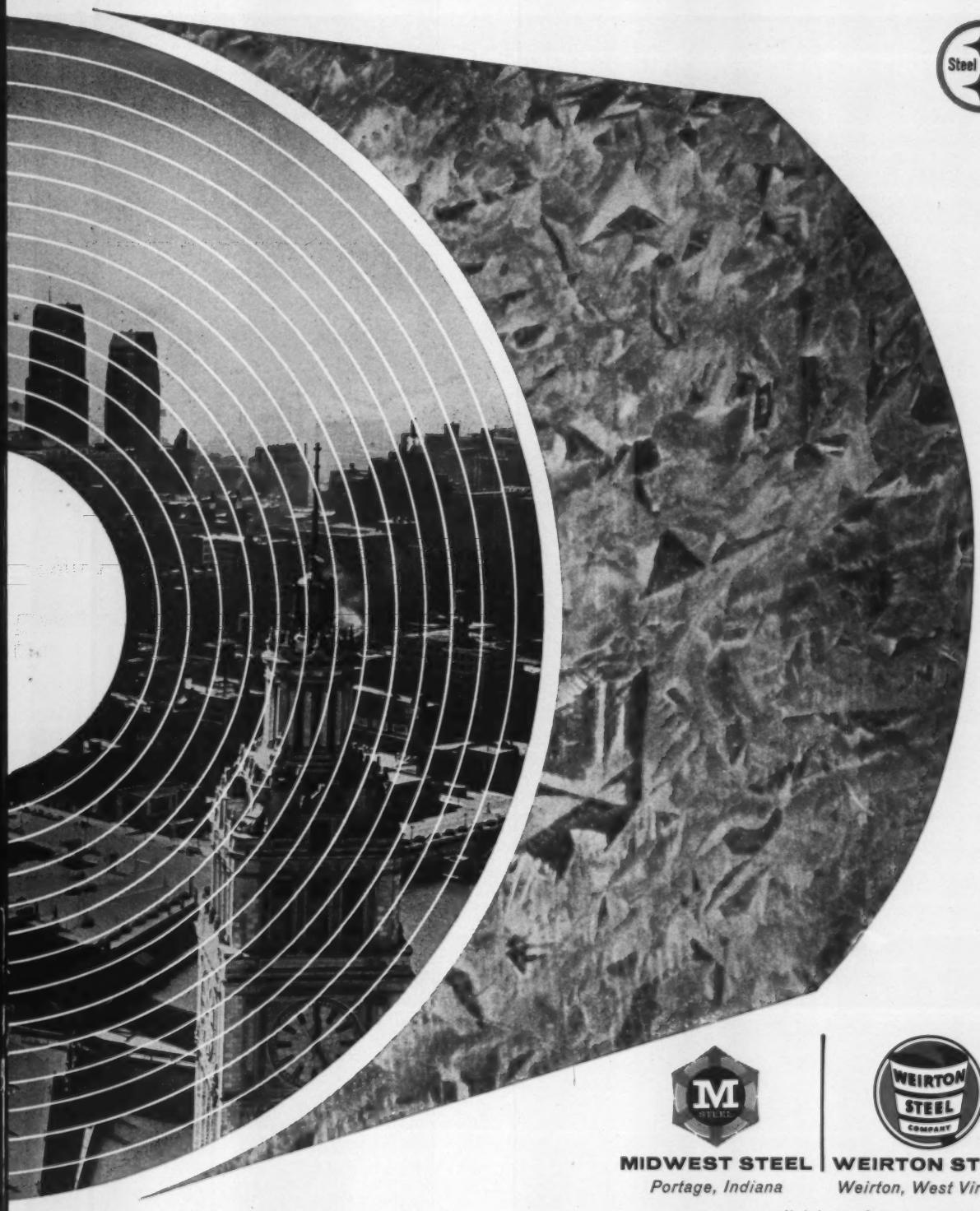
326



NOW
MORE
GALVANIZED
STEEL
FOR
MID-AMERICA
FROM
NEW

MIDWEST STEEL

For one of the greatest steel-consuming areas of the country, galvanized steel will now be in greater supply. The source is close, the service is fast, and the quality is second to none. Because



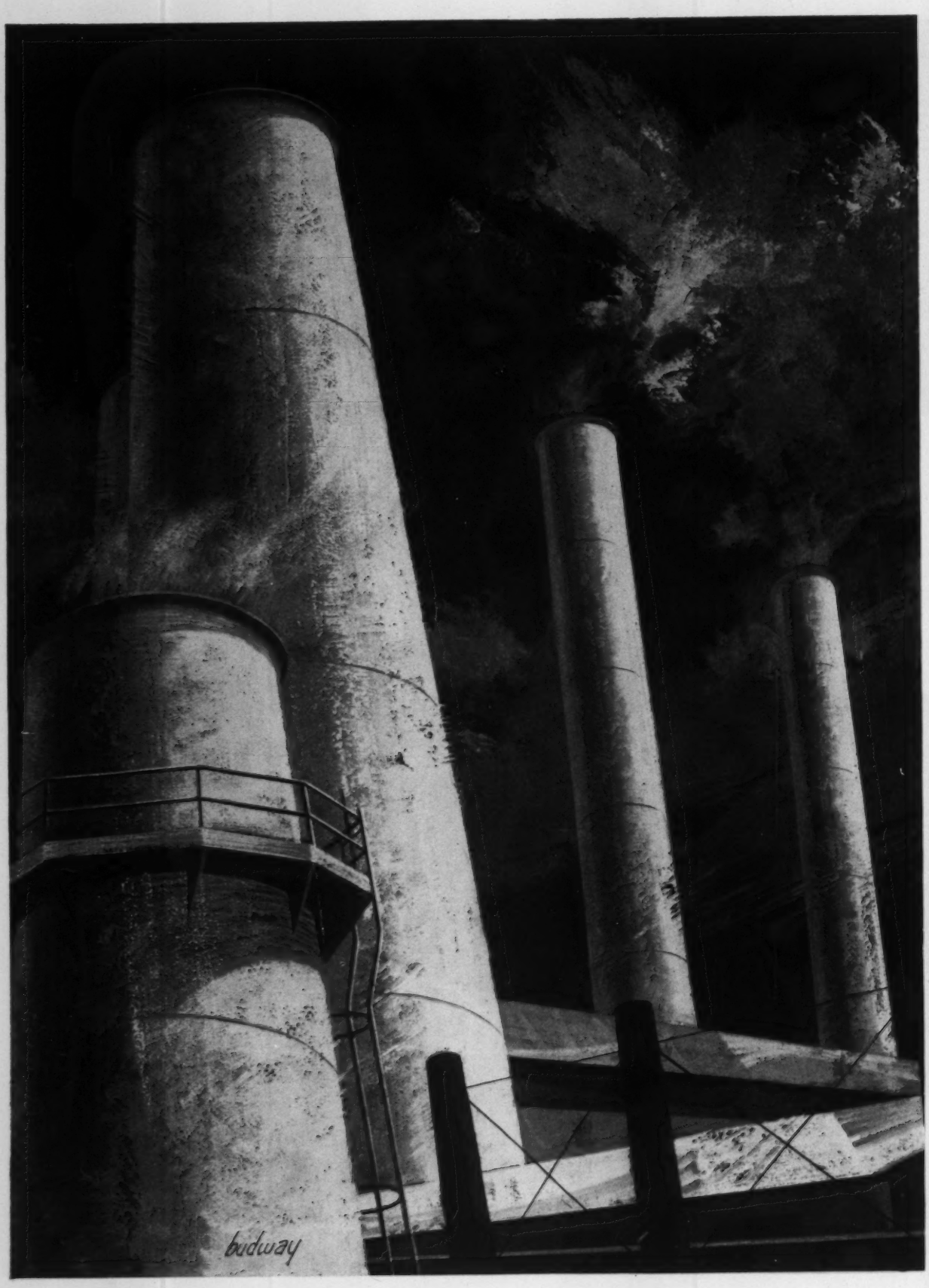
MIDWEST STEEL | **WEIRTON STEEL**

Portage, Indiana *Weirton, West Virginia*

divisions of

NATIONAL STEEL CORPORATION

Weirkote, the modern continuous-process galvanized steel, is now being produced at our new Midwest Steel facilities in the Chicago area, as well as at our Weirton Steel division in the Pittsburgh area.


budway

Did you know there is a guaranteed way to clean stack gases?

Cleaning your gases is not a simple task. A careful analysis must be made of flue gas temperature, dust composition, and such things as dust loadings and gas volume. It takes a real crew of experts to make sense out of the data, then design, manufacture, and install equipment with *guaranteed* gas-cleaning efficiency.

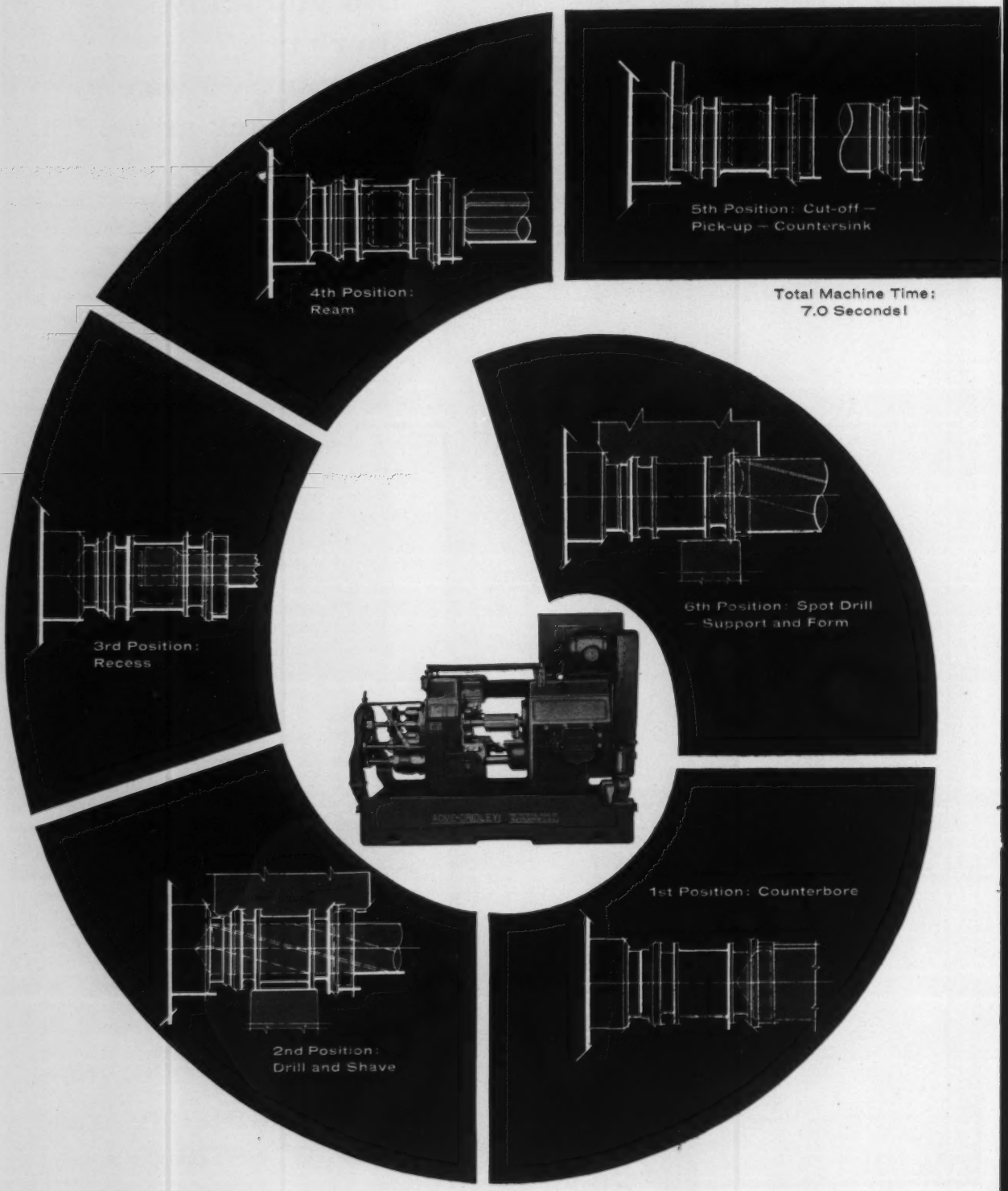
Koppers has over 50 years of industrial gas-cleaning experience. They're experts. Koppers designed and installed the first successful electrostatic precipitators for hot metal open hearth furnaces.

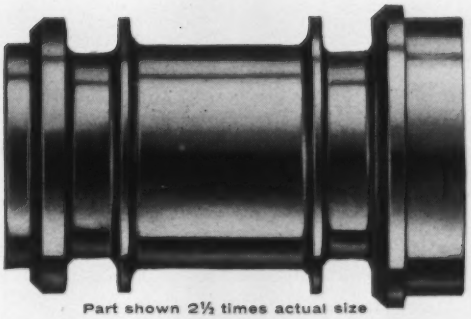
Two Koppers divisions work cooperatively to provide effective gas-cleaning installations. The Engineering and Construction Division can design and install a gas-cleaning system which will eliminate fumes, acid mist, ashes, or dust, as well as recover valuable materials at low cost per cubic foot of gas processed. Precipitators made by the Metal Products Division can be used with any steelmaking or ironmaking furnace, and they operate at close to 100% efficiency, with very little maintenance required.

Two outstanding examples of Koppers installations are the open hearth furnaces at Fairless Works of United States Steel Corporation, and the blast furnaces at Great Lakes Steel Division of National Steel Corporation. A completely different system was designed and installed by Koppers for the McLouth Steel Corporation. Here, they used pressure-type disintegrators to clean gases from electric furnaces and new oxygen converters. It proved efficient for both steelmaking processes. And Koppers is now installing seven additional electrostatic precipitators and ten additional waste heat boilers to control the gas discharge from open hearth furnaces at the Pittsburgh Works of Jones & Laughlin Steel Corporation.

Koppers will be glad to analyze your operation, too. Write to Koppers Company, Inc., Engineering and Construction Division, Pittsburgh 19, Pennsylvania.

KOPPERS® ENGINEERING and CONSTRUCTION


5th Position: Cut-off — Pick-up — Countersink
Total Machine Time: 7.0 Seconds!
4th Position: Ream
3rd Position: Recess
6th Position: Spot Drill — Support and Form
1st Position: Counterbore
2nd Position: Drill and Shave



Part shown 2½ times actual size

"EVEN WE WERE SURPRISED WHEN THE ACME-GRIDLEY DOUBLED OUR PRODUCTION

We'd refigured our set up for bushing blank production and were convinced that the Acme-Gridley would produce greater results than our current automatic machine set up. But, when we *doubled* production and wiped out a 7% reject rate to boot, we were amazed!"

Here at National Acme, we hear a lot of statements like this one made by Ness, Inc., up in Rochester, N. Y. They're one of the country's top product shops and tell us Acme-Gridleys have a lot to do with their success. Just about anybody who has to produce large amounts of an identical precision part will tell you the same thing.

The number of *different* jobs that can be set up on an Acme-Gridley amazes everyone. To give you some idea, we've described some 57 actual jobs in a new 64 page bulletin called "Circumferential Automation at Work". For your free copy, call, write or wire.

National Acme

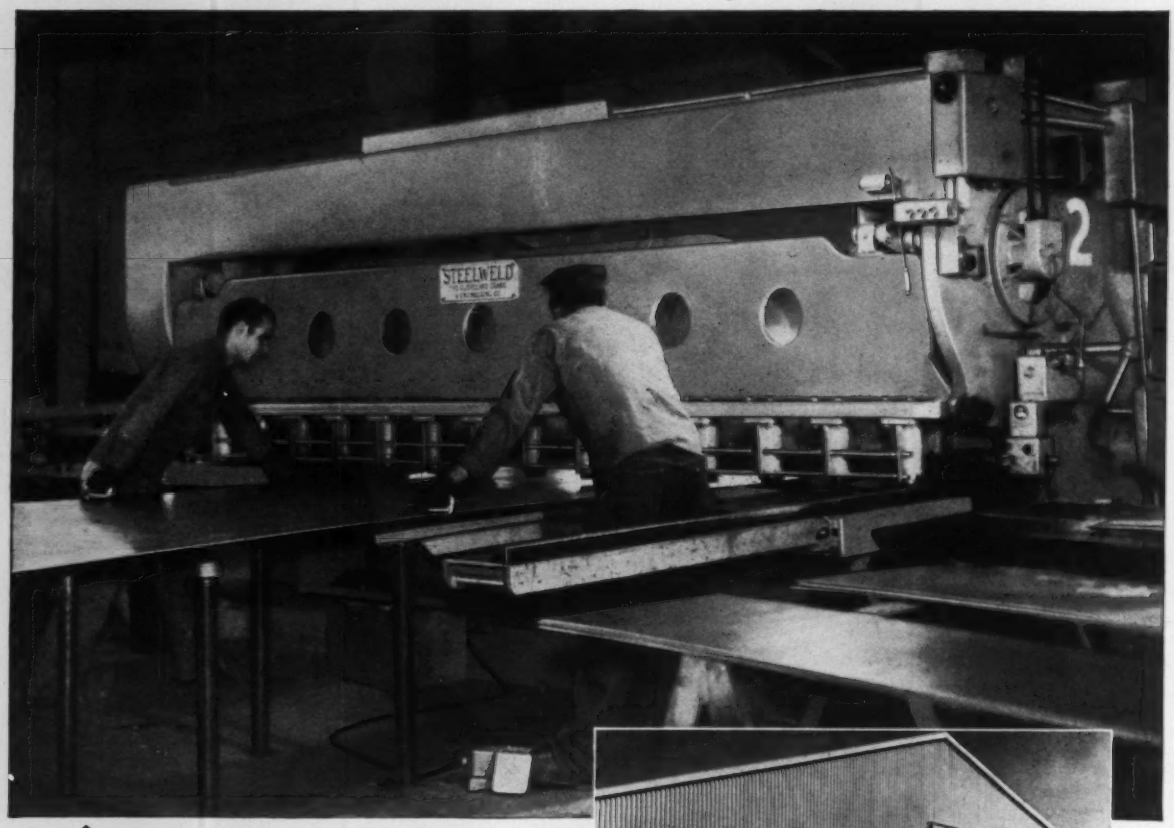
The National Acme Company
189 E. 131st Street
Cleveland 8, Ohio

Sales Offices: Newark 2, N.J.; Chicago 6, Ill.; Detroit 27, Mich.

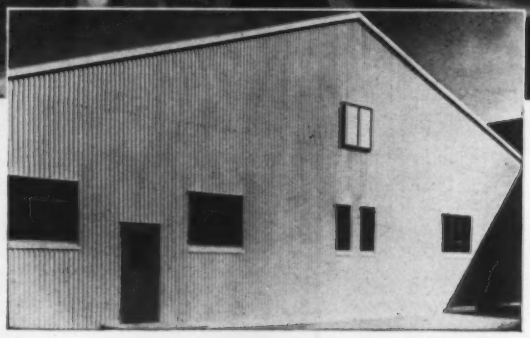
STEELWELD SHEAR

Operates 16 Hours a Day

Cuts Components for Prefabricated Buildings



Cutting and slitting operations normally keep this Steelweld Shear busy 16 hours a day. It is equipped with Steelweld's popular Micro-Set Knife Adjustment. This permits adjusting the knife clearance to suit the thickness of metal being cut in the matter of seconds. Thus, the finest cuts are assured for every shearing job.



A recent Pascoe Building.

RAPIDLY forging ahead in the prefabricated steel building field, Pascoe Steel Corporation, Pomona, California, has found its Steelweld Shear to be an extremely important factor in maintaining a steady rate of production. A large amount of shearing is required to fabricate several hundred tons of steel per month.

The Shear is normally operated 16 hours a day. It is used for cutting web plates for building columns, rafters and many other building components. About 20 hours a week it is used for slitting. The machine has functioned with very little maintenance. In nearly three years of service, the clutch has never required adjustment.

For the very latest in shears and brakes, mechanically or hydraulically operated, be sure to see what Steelweld has to offer.

Write for free copy of catalog No. 2011

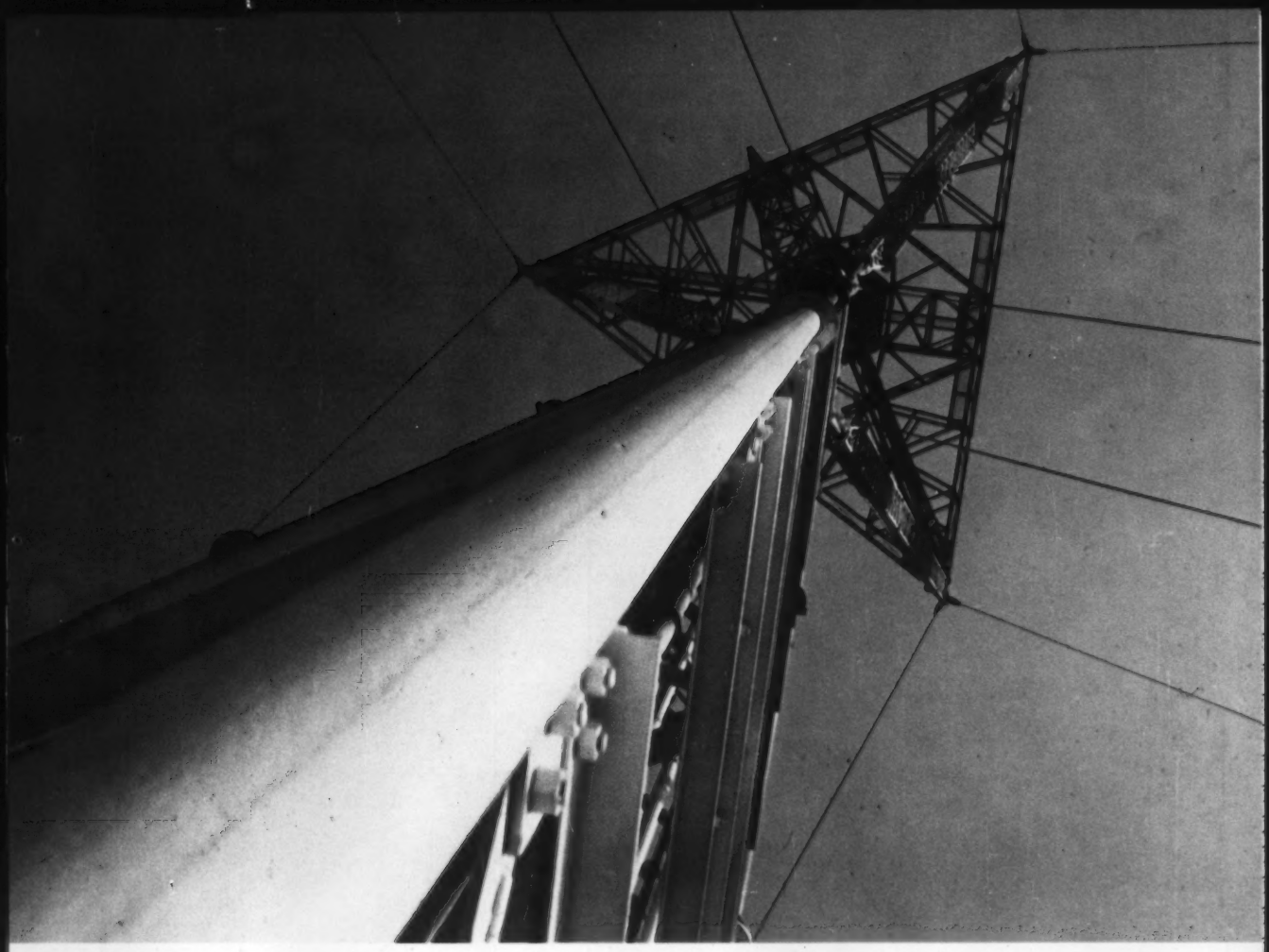
STEELWELD

Mechanical and Hydraulic

SHEARS PIVOTED BLADE

Steelweld Machinery includes: Mechanical & Hydraulic Shears and Press Brakes, One-, Two- and Four-Point Straight-Side Presses, Speed-Draw Presses.

STEELWELD DIVISION • THE CLEVELAND CRANE & ENGINEERING CO. 7859 E. 282nd ST. • WICKLIFFE, OHIO



"T-1" Steel cuts size of tower legs 50%

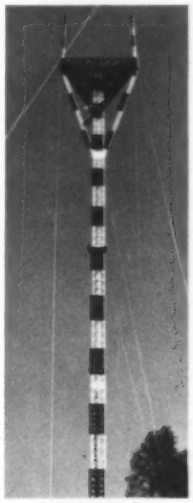
This spectacular, 730-foot, candelabra-type TV tower in Baltimore, Maryland, was built to withstand hurricane winds of 165 mph. The legs had to be *extra* strong to support the weight of three 10-ton antennas plus the weight of a triangular platform 105 feet long on each side.

The designers chose USS "T-1" Constructional Alloy Steel for the legs because its great strength permitted a reduction in leg size of almost 50%. Wind resistance was reduced and only 105 tons of 5¾" to 7" quenched and tempered, straightened and stress-relieved "T-1" Steel rounds were used for the legs. If structural carbon steel had been used, approximately 300 tons of steel in diameters up to about 12 inches would have been necessary.

Chief advantages of USS "T-1" Steel

You may not be in the market for a TV tower, but if you are building large structures or rugged equipment, "T-1" Steel offers these plus values:

Super Strength—Minimum yield strength 100,000 psi in bar diameters up to 4 inches or plate thicknesses up to 2½"—three times the yield point of structural carbon steel.



World's first 3-antenna, candelabra-type TV tower for Baltimore stations WBAL, WJZ and WMAR. Designed and fabricated by Dresser-Ideco Co., Columbus Ohio. Erected by J. F. Beasley Construction Co., Muskogee, Okla.

Resistance to impact abrasion—Very high. Shovel parts, truck liners, conveyor parts, bins, chutes last up to five times as long.

Atmospheric Corrosion Resistance—Four times that of carbon steel. This results in a considerable increase in paint life.

Toughness—Outstanding at both low and high temperatures.

Weldability—Readily weldable without preheating or stress relieving.

Costs—Where the designer takes full advantage of "T-1" Steel's superior properties, overall costs can be greatly reduced due to sizable savings possible in material, fabrication, construction and maintenance.

Write for our book, "Fabrication and Design of Structures of 'T-1' Steel," which gives complete information. United States Steel, 525 William Penn Place, Pittsburgh 30, Pa.

USS and "T-1" are registered trademarks

United States Steel Corporation—Pittsburgh
Columbia-Geneva Steel—San Francisco
Tennessee Coal & Iron—Fairfield, Alabama
United States Steel Supply—Steel Service Centers
United States Steel Export Company

United States Steel

This mark tells you a product is made of modern, dependable Steel.

New top for the Shippingport reactor

By the Ohio River at Shippingport, Pa., the United States' first full-scale central station atomic power plant devoted exclusively to civilian needs continues to generate electricity for the Pittsburgh district. In operation since 1957, Shippingport's reactor core received its second "seed" fuel early in 1960. The pioneer atomic plant is a joint project of the Duquesne Light Company and the Atomic Energy Commission.

The nuclear portion of Shippingport was designed and developed by Westinghouse under the direction of and in technical cooperation with the Naval Reactors Branch of the Atomic Energy Commission. The work was done at the Bettis Atomic Power Laboratory which Westinghouse operates for the AEC.

U. S. Steel's Homestead Plant supplied the forgings for the closure-head assembly needed to accommodate a new and higher power core developed by the Bettis Laboratory for Shippingport. As furnished, the 3-piece assembly weighs 81 tons—and every ounce of these USS Quality Forgings was cast, forged, machined and tested to meet the most rigid specifications.

The reactor's new closure-head assembly for Core 2 consists of a dome, torus, and head flange. The largest piece—the head flange—weighs 41 tons. To insure the highest degree of quality from the start, it was electric-furnace melted from a Ni-Cr-Mo alloy steel, then teemed into a 180-ton ingot in U. S. Steel's vacuum-casting facilities. After top and bottom discard, it was forged to an 85″ octagon; then it was upset to 60″ in height. Next a 30″ hole was punched in it to provide for mandrel forging. This hole was later opened up to take a 36″, and finally a 54″ forging bar. At this point the ring was flattened to 43″, the bar was again inserted in the center and the ring was mandrel-forged to its final dimensions—159″ overall diameter, 98″ interior diameter, and 42½″ high, as shown in the big picture. It then weighed 83½ tons and was ready for heat treating and preliminary machining. Final machining reduced the flange's shipping weight to 41 tons.

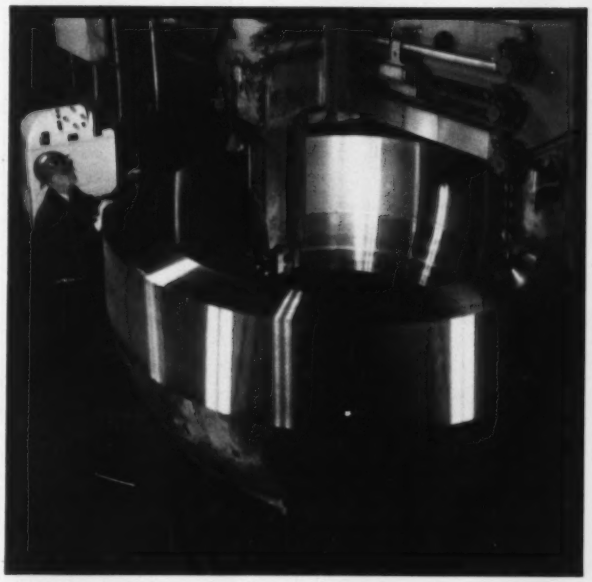
The torus, or "transition ring," was manufactured from the same grade of steel in the same careful, expert manner. It weighs 23 tons after final machining.

The dome is hollowed out on the inside and has a relatively small hole through its middle. This hole provides a refueling port; separate openings for control rod mechanisms were bored later. The dome was machined on our 20′ vertical boring mill with the aid of an electronic contouring machine. Final weight of the dome: 17 tons.

Dome, torus and flange were painstakingly tested and inspected every step of the way. Tests included ultrasonic inspection, tangential tension tests, Charpy V notch impact tests, grain size tests, bend tests and magnetic particle inspection.

U. S. Steel has the capacity, the men, and the equipment to manufacture quality forgings like these, whether they be rings, flanges, domes, pressurizers, tube sheets or other such nuclear and power plant components. And the very same men and equipment will be working on *your* order. For a free folder on USS Nuclear Forgings, write United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

USS is a registered trademark



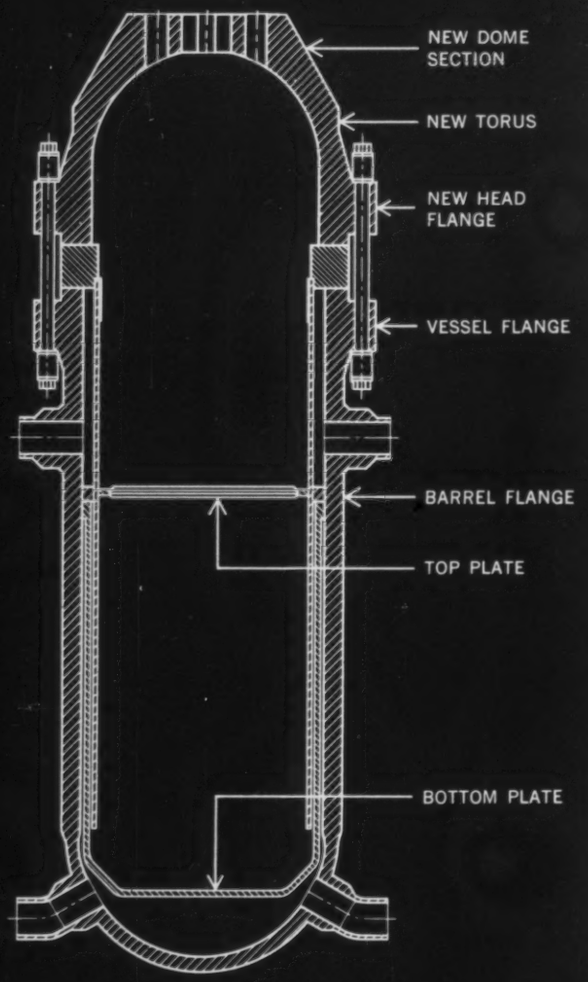
Photos, top to bottom—
head flange about to be quenched;
torus being contour machined;
ultrasonic inspection of dome.

United States Steel Corporation—Pittsburgh
Columbia-Geneva Steel—San Francisco
Tennessee Coal & Iron—Fairfield, Alabama
United States Steel Export Company

United States Steel

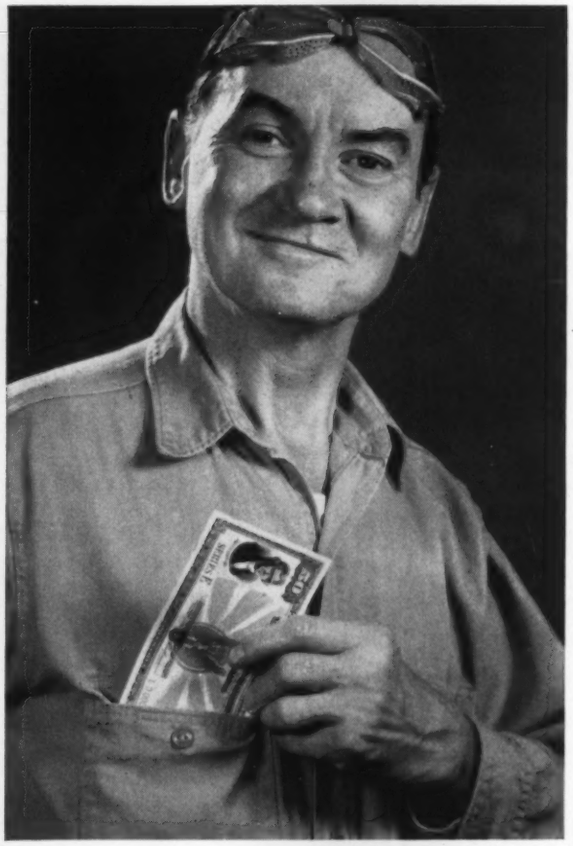
Core 2

FORGED COMPONENTS



Since the three parts of this reactor vessel head—dome, torus and flange—will be welded into a single unit, there can be no allowance for failure. Every square inch of these three USS Quality Forgings were painstakingly manufactured and carefully inspected during and after the manufacturing process to assure perfection. The men, the forging facilities and the inspection equipment are available to you if you need forgings that must be as close to perfection as we can make them.

How 45,000 companies help their employees buy security



45,000 American business firms have put in a valuable service for their employees—the Payroll Savings Plan for U.S. Savings Bonds. Through this plan the company payroll clerk sets aside a certain amount for each participating employee, each payday. Bonds are delivered to employees as soon as they are fully paid for. It's fully automatic, and the easiest way in the world to save.

More than 8 million employees are using the plan, and are saving about $2 billion in Savings Bonds a year. These funds have helped buy homes, finance vacations, assure college educations and provide nest-eggs for retirement.

If your company has not installed the Payroll Savings Plan thus far, contact your State Savings Bonds Director and have him show you how the Plan works. Get his experienced help in presenting the Plan to your organization. Or write Savings Bonds Division, U.S. Treasury Department, Washington, 25 D. C.

Hats off to American Industry!

"American Industry—by promoting the Payroll Savings Plan—has given the Savings Bonds Program its greatest success," says William H. Neal, National Director of the Treasury's Savings Bonds Program.

ALL U.S. SAVINGS BONDS—OLD OR NEW—EARN ½% MORE THAN BEFORE

20th ANNIVERSARY 1941 1961

STEEL The Metalworking Weekly

THE U. S. GOVERNMENT DOES NOT PAY FOR THIS ADVERTISEMENT. THE TREASURY DEPARTMENT THANKS, FOR THEIR PATRIOTISM, THE ADVERTISING COUNCIL AND THE DONOR ABOVE.

high lubricity in water

Stuart's SOLVOL

liquid cutting compound

You may not be using soluble oils for "big chip" machining. But there is a super-lubricity compound—Stuart's Solvol—designed specifically for these jobs. A cutting fluid more and more of America's top companies are using for broaching, milling, and heavy-duty turret lathe work.

Compounded of a high-lubricity fatty oil, petroleum base, and a heavy-duty emulsifier, Solvol gives you the right combination of lubricity and cooling action for economical tool life at efficient machine speeds. Here's why . . .

Extremely fine particles of fatty oil are suspended in water like millions of delicate organisms under the sea. Fatty oil that comes from the sea—the best fat for lubricity money can buy. Solvol's high concentration of sperm oil allows chips to slide over the tool face without high friction and heat build-up. Stops chip welding and tool breakdown.

You get all these advantages in a water-mix compound that cools faster, eliminates smoke, handles a wide range of cutting operations at the lowest possible tool lubrication cost.

So, when you make the switch from straight oils to a water-mix cutting fluid, don't sacrifice lubricity. Because Solvol combines both—the cooling capacity of water, with the extra lubricity you need for economical machining.

Stuart

low friction · high finish

Stuart's CODOL liquid grinding compound

Grinding experts will tell you there's only one way to get a slick surface finish without going to extremely fine grit wheels or a straight grinding oil—and you don't have to give up wheel life or cooling action to get it.

That is by utilizing the balanced lubricating and scrubbing action of a water-mix like Stuart's Codol liquid grinding compound. For Codol's balanced formula provides the high surface finish advantages of a straight oil . . . in colloidal form . . . plus the cooling capacity of water.

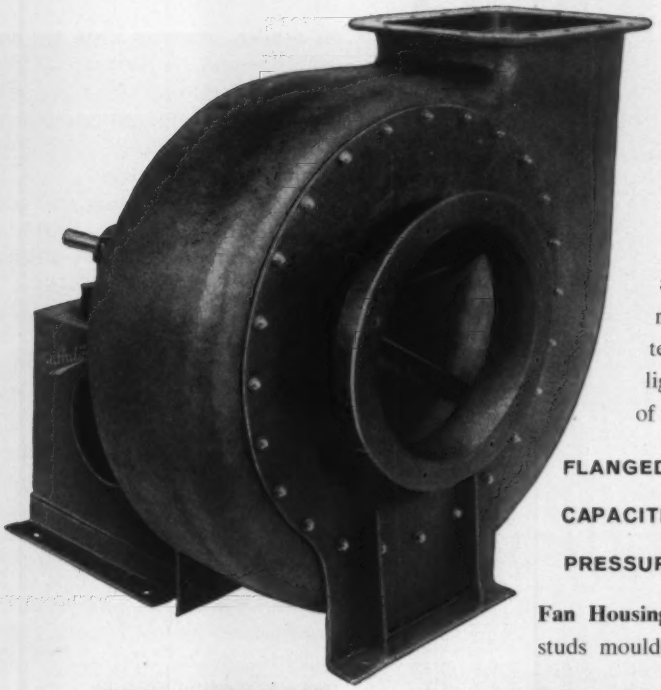
Extremely fine oil particle size results in a near-transparent solution. Codol is not an opaque emulsion like most soluble oils . . . yet, it has none of the machine maintenance disadvantages of transparent compounds.

Use Codol when you want to keep grinding wheel inventory costs at a minimum and production efficiency right at peak.

Stuart

D. A. STUART OIL CO., LIMITED
2727 South Troy Street, Chicago 23, Illinois

Canadian D. A. Stuart Oil Co., Limited, P. O. Box 430, 43 Upton Road, Scarborough, Ontario, Canada



A BUFFALO RESIN-BONDED FIBER GLASS FAN MAY BE YOUR ECONOMICAL ANSWER

Excellent chemical resistance to a wide range of acids, salts, gases, organic materials and other corrosives — strength and resilience — ability to stand temperatures up to 300°F. with special resins — and light weight are some of the desirable characteristics of the 'Buffalo' Type FG Fan.

FLANGED INLET AND OUTLET—for gas-tight connections.

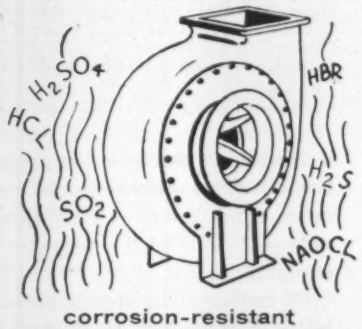
CAPACITIES — up to 34,000 cfm.

PRESSURES — up to 10″ static.

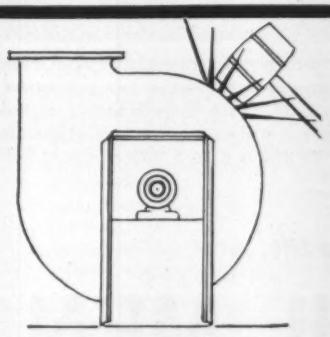
Fan Housing — resin-bonded fiber glass with stainless steel studs moulded-in for mounting to the bearing stand flange. Efficient scroll shape.

Rotor— husky steel wheel completely encased in resin-bonded fiber glass. Factory-balanced, statically and dynamically, for vibrationless performance.

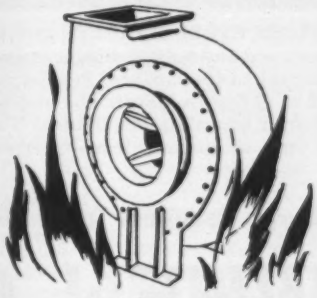
FUME-HANDLING PROBLEM?



corrosion-resistant



impact-resistant



won't support combustion

WRITE FOR BULLETIN FI-511 for all details and chemical resistance table.

BUFFALO FORGE COMPANY

Buffalo, New York

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

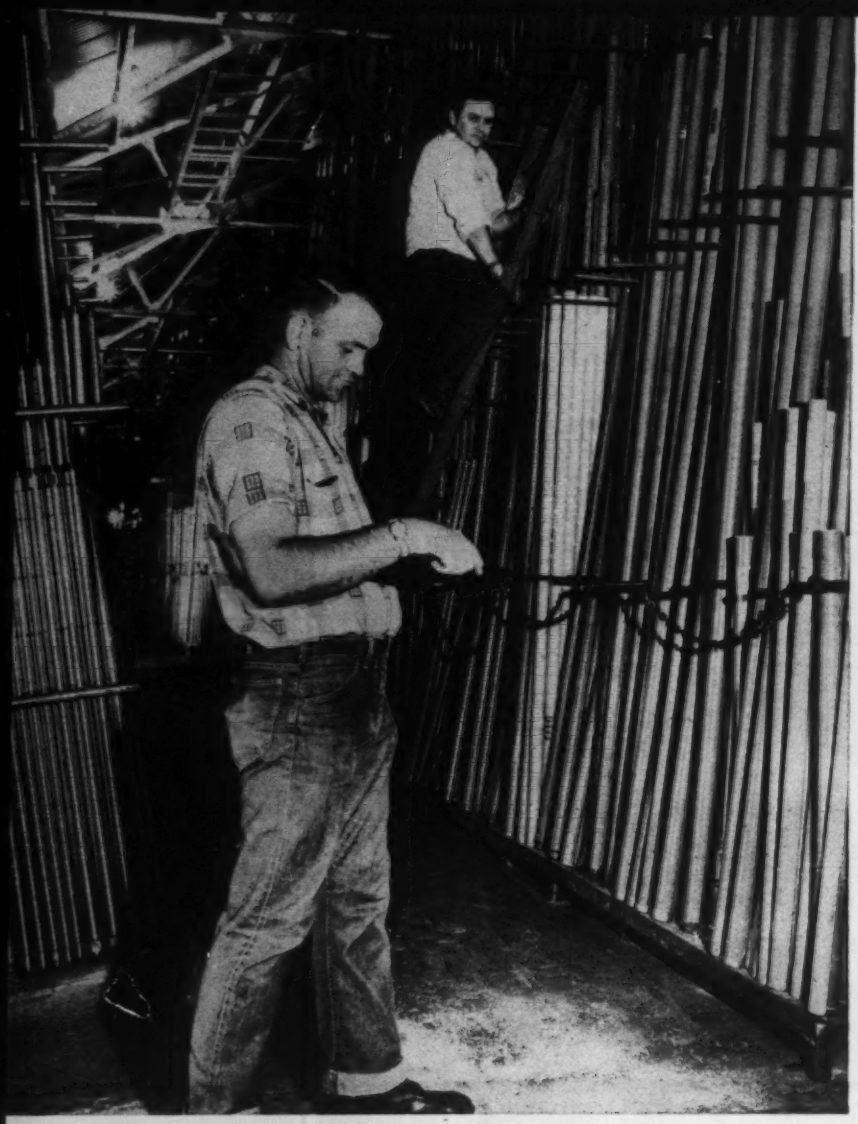
"Buffalo"

Buffalo air handling equipment to move, heat, cool, dehumidify and clean air and other gases.

Buffalo Machine Tools to drill, punch, shear, bend, slit, notch and cope for production or plant maintenance.

Buffalo Centrifugal Pumps to handle most liquids and slurries under a variety of conditions.

Squier machinery to process sugar cane, coffee and rice. Special processing machinery for chemicals.



SEAMLESS STEEL BARRELS and other pump components of Harbison-Fischer's rod and tubing displacement pumps show great size range required to bring oil to the surface. Pumps vary on I. D. from ¾ inch to 5¾ inches; from 3 to 42 feet in length. Harbison-Fischer counts on commercial quality Pittsburgh Seamless Mechanical Tubing to get a 4 to 6 micro-inch I. D. finish with minimum clean-up expense.

Pittsburgh Seamless Tubes Give a Lift...

WHEN OIL MEN MAN THE PUMPS

When the gusher quits gushing and the oil flow slows to a trickle, it's time for oil men to man the pumps.

Pittsburgh Steel Company helps give them the lift they need with seamless mechanical tubing for sub-surface displacement pumps made by Harbison-Fischer Manufacturing Company of Fort Worth, Texas.

Nine of every ten producing wells must be pumped—and most depend on slender, precision-made rod and tubing pumps for efficient oil production. Harbison-Fischer has supplied them to the oil industry for more than 25 years—"The Best Pumps in the Oil Patch."

Among its eight types and wide range of sizes, there's a Harbison-Fischer pump to match every lifting job and well condition, whether it be depth, heat, pressure, corrosion or abrasion.

Pittsburgh Seamless Mechanical Tubing forms the pump barrel that contains plungers and valves. Besides destructive conditions below surface, barrels often must bear the weight (5 to 6,000 psi) of a fluid column of oil 10,000 feet or more deep.

● **Tight Specs**—To meet rigid API standards as well as its own manufacturing needs, Harbison-Fischer requires mechanical tubing with exact chemical and physical properties, and close tolerance I. D. and wall dimensions.

It demands tubing that is exceptionally straight, free of seams, laps and pits; made of steel that is machinable, and—in the high carbon range—fine grained and hardenable.

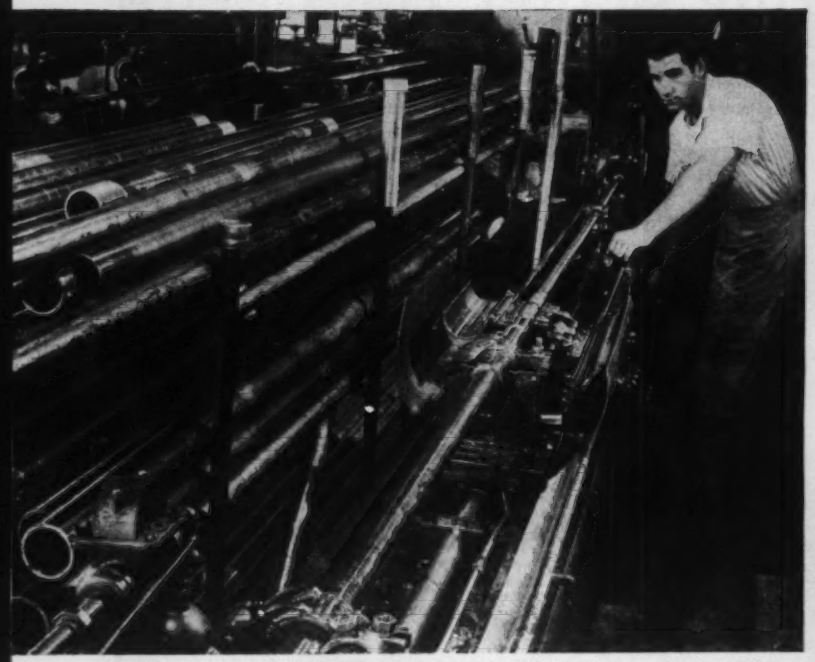
Pittsburgh Steel answers these requirements with mechanical tubing in C-1015 and C-1040 grades in commercial quality to help Harbison-Fischer hold processing to a minimum.

● **Fine I. D. Surface**—In production, Harbison-Fischer wants minimum stock removal to obtain a mirror I. D. finish and extreme straightness.

On its dozen long-stroke hydraulic hones, H-F holds the I. D. stock removal to a few thousandths of an inch. Says Harbison-Fischer:

"The honed I. D. must be entirely free of pits. We want a four to six micro-finish. So you can see why the tubing's I. D. mill finish is important."

After threading and honing, every barrel is re-straightened to a tolerance of .015 TIR (total indicator



YOU CAN BE SURE WITH SEAMLESS. Straightness, close tolerance wall thickness and absence of seams, laps and pits in Pittsburgh Seamless Tubing mean fast, easy clean-up on horizontal hones. Minimum stock removal in honing tube's inner surface results in a mirror finish. Six-foot tube being set up here will become working barrel of two-inch tubing pump.

HONED TUBE GETS RIGID INSPECTION. Inspector uses I. D. micrometer to make certain barrel of 3-inch tubing pump stays within tolerance limits of —.0000/ +.0015 inch.

PRODUCTION PERSONNEL check wide variety of tubing used by Harbison-Fischer to produce "Best Pumps in the Oil Patch" for world-wide market.

reading) to overcome distortion caused by working of the tubing.

For installations where hard pumping and hard wear are factors, Harbison-Fischer heat-treats high carbon barrel tubing by an exclusive electronic process. The process penetrates the I. D. a predetermined depth to produce exceptional wearing quality, while permitting the O. D. to remain ductile and shock resistant.

Applications such as Harbison-Fischer's are typical of the uses to which Pittsburgh Seamless Tubing is put. There are thousands of them.

If you manufacture cylindrical products or parts requiring close tolerance, smooth surface or specific physical properties, you can be sure with Pittsburgh Seamless Mechanical Tubing. It can save you time and processing costs. Contact one of the district offices or distributors listed at the right. A Pittsburgh Steel representative will show you how.

Pittsburgh Seamless Distributors

Baker Steel & Tube Company
Los Angeles, California

Chicago Tube & Iron Company
Chicago, Illinois

Cleveland Tool & Supply Co.
Cleveland, Ohio

Drummond, McCall & Co., Ltd.
Montreal, Quebec, Canada

Edgcomb Steel Company
Philadelphia, Pennsylvania

Gilmore Steel Corporation
San Francisco, California

Earle M. Jorgensen Co.

Kilsby-Tubesupply, Division of
Republic Supply Co.
of California
Los Angeles, California

Mapes & Sprowl Steel Co.
Union, New Jersey

Metal Goods Corporation
St. Louis, Missouri

Miller Steel Company, Inc.
Hillside, New Jersey

A. B. Murray Co., Inc.
Elizabeth, New Jersey

C. A. Russell, Inc.
Houston, Texas

Ryerson, Joseph T. & Son, Inc.

Solar Steel Corporation
Cleveland, Ohio

Standard Tube Sales Corp.
Brooklyn, New York

Steel Sales Corporation
Chicago, Illinois

Tubular Sales
Detroit, Michigan

Tubular Service Corp.
Springdale, Pennsylvania

Ward Steel Co.
Boston, Massachusetts

Ward Steel Service Company
Dayton, Ohio

Pittsburgh Steel Company

Grant Building • Pittsburgh 30, Pa.

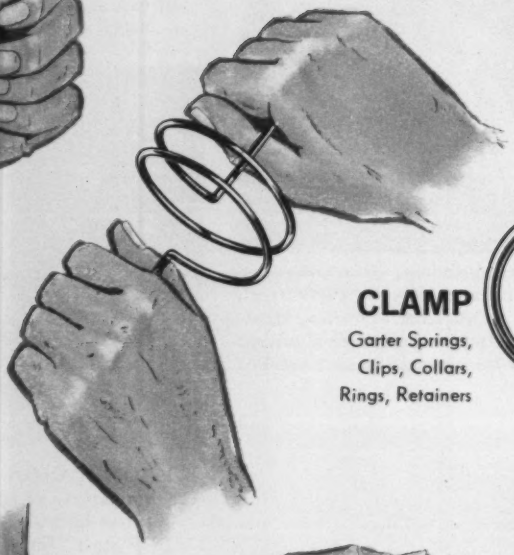
DISTRICT SALES OFFICES

Atlanta, Chicago, Cleveland, Dayton, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, Tulsa, Warren, Ohio

Select the Spring Action You Need–
A.S.C. Can Supply It!

WIND
Spiral Torsion,
Flat Coil, Power,
Motor, Hairspring

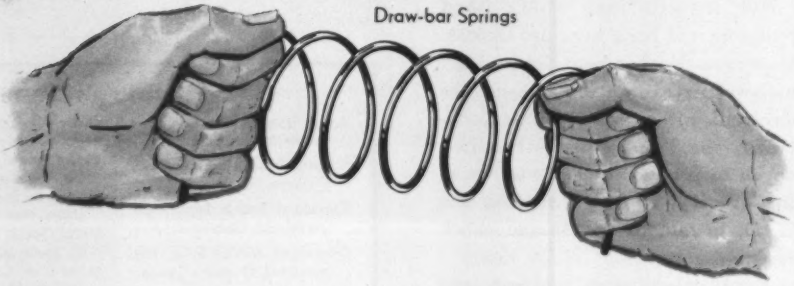
PUSH
Compression Springs,
Belleville Springs,
Energy Cartridge

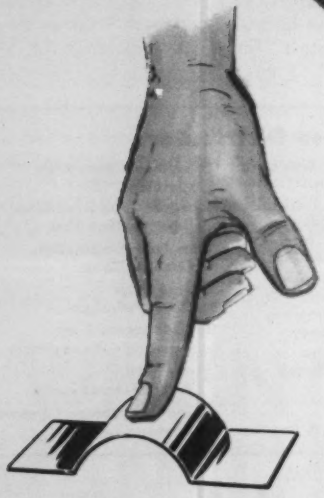


TWIST
Single and Double
Helical Torsion Springs,
Volute

CLAMP
Garter Springs,
Clips, Collars,
Rings, Retainers

PULL
Extension Springs,
Draw-bar Springs





PRESS
Flat Springs, Small Stampings,
Custom-made Fasteners,
Special and Stock Washers

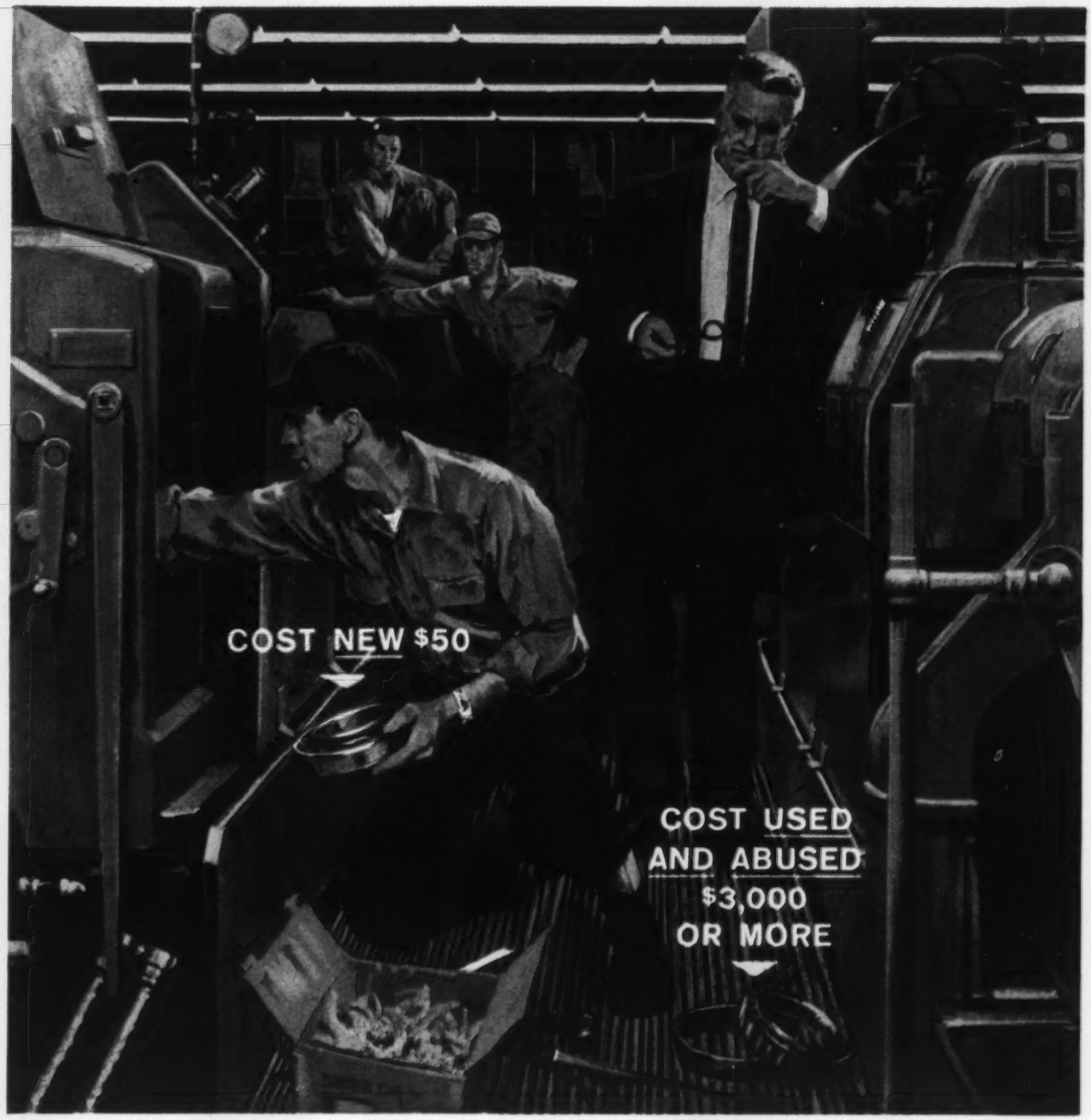
Whatever your spring requirements—small or large sizes and quantities—A.S.C. can meet them. Get a copy of this pocket guide to learn more about how Associated Spring can help you.

6100

Associated Spring Corporation

General Offices: Bristol, Connecticut

Wallace Barnes Division, Bristol, Conn. and Syracuse, N. Y.
F. N. Manross and Sons Division, Bristol, Conn.
Dunbar Brothers Division, Bristol, Conn.
Wallace Barnes Steel Division, Bristol, Conn.
Raymond Manufacturing Division, Corry, Penna.
Ohio Division, Dayton, Ohio
Cleveland Sales Office, Cleveland, Ohio
Chicago Sales Office, Chicago, Ill.
B-G-R Division, Plymouth and Ann Arbor, Mich.
Gibson Division, Mattoon, Ill.
Milwaukee Division, Milwaukee, Wis.
Seaboard Pacific Division, Gardena, Calif.
Wallace Barnes Co., Ltd., Hamilton, Ont. and Montreal, Que.



That real cost figure tells him why lubrication is a management responsibility

When a bearing fails, a new one will cost, say, $50. But if that failed bearing shuts down your entire production line, the resulting downtime and lost production can run the bill up to $3,000 or more. And that's your *real* replacement cost.

Only management can effect a cure for this severe bite out of profits. Here's why:

A failed part is only a symptom; very often the *cause* is improper lubrication. The part can be replaced but the cause remains. The machine will fail again.

Like any plant-wide operation procedure, an organized lubrication system—which will prevent the vast majority of equipment failures—has to come from the top. For this reason, lubrication is a management responsibility.

For a preview of what Organized Lubrication can accomplish in your plant, we invite you to see our new movie "Stop Loss with Organized Lubrication." For an early showing, write:

Texaco Inc., 135 East 42nd Street, New York, N.Y., Dept. S-171.

LUBRICATION IS A MAJOR FACTOR IN COST CONTROL

Lower Costs — Increase Profits with

CENTRALIZED POWER CONTROL

..... on the BULLARD DYNAMILL* H.B.M.

Large, easy to read clock-type dials allow the operator to "power" position the head, table, saddle and spindle in relation to the work piece without the use of hand cranks or levers. These dials, when the machine is equipped with numerical control, provide an accurate, instantaneous visual read-out on the positioning of the system.

Simple push buttons on the control pendant direct all motions of the head, table, saddle and spindle. Spindle start and stop, as well as spindle speed changes, are controlled from buttons on the pendant. Four traverse rates and feed engagement are actuated by the operator's forefinger on the pendant trigger.

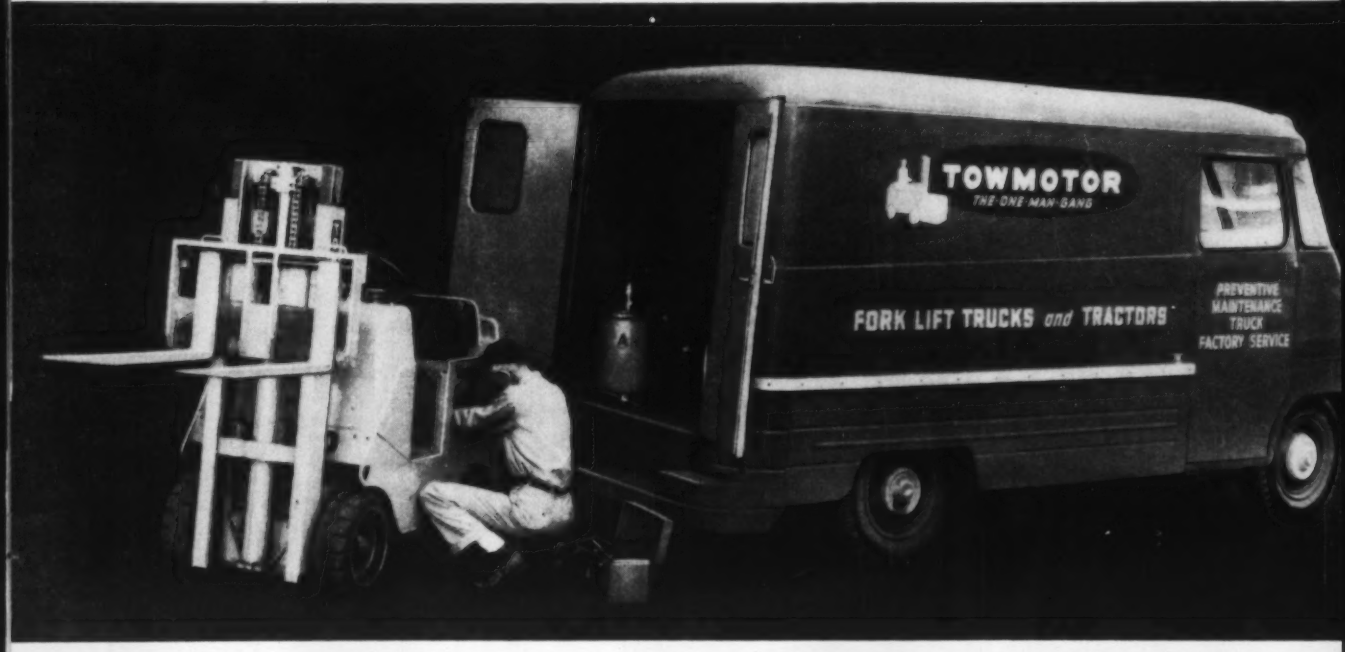
Thus, within the span of a man's hand, are centralized power controls which allow the operator to keep the tool in the cut more of the time — thereby reducing costs and increasing profits.

For Complete Information,
ask your nearest Bullard Sales Office for a catalog or write to

*Trade Mark

THE BULLARD COMPANY • BRIDGEPORT 9, CONNECTICUT

Towmotor backs up outstanding performance



with Towmotor dependable service

When you purchase Towmotor equipment you can be sure it will never be out of service very long . . . for two very good reasons:

1. Towmotor fork lift trucks are built to last, and built to perform continuously.
2. When needed, you get fast and skillful repair and maintenance service from your local dependable Towmotor representative.

Your Towmotor representative will never let downtime cut into the money you *save* by owning a Towmotor fork lift truck! That's why Towmotor customers keep buying Towmotor equipment. Ask for complete information on Towmotor equipment and Towmotor Preventive Maintenance Service. Write Towmotor Corporation, Cleveland 10, Ohio.

TOWMOTOR ® **-GERLINGER***

THE ONE-MAN-GANG

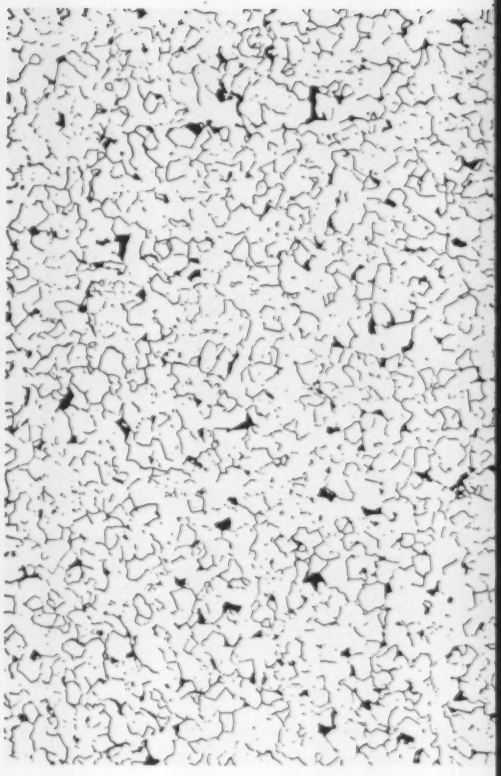
FORK LIFT TRUCKS, CARRIERS AND TRACTORS SINCE 1919

*Gerlinger Carrier Co. is a subsidiary of Towmotor Corporation

This mark tells you a product is made of modern, dependable Steel.

What you see can't hurt you—At the right is a section of USS National Electric Welded Tubing magnified 100 times with a metallograph to check for weld flaws—and there aren't any here. You can't even see where the tubing ends and the weld begins. Their grain structure is identical. (The weld runs vertically down the center of the picture.) Even microscopic flaws are easy to spot on the acid etched surface. We also check the microstructure, cleanness, and grain size of the weld. Welded tubing must be flawless so we don't depend on visual inspection alone. To be absolutely sure, we test our tubing far beyond specifications. To do this we have designed new and more accurate testing equipment. Some of this test equipment even tells us when it is not working properly. We go to extremes to be sure that USS National Electric-Resistance Welded Tubing will stand up in critical pressure and mechanical applications that demand the utmost in strength, dependability, and uniformity. If you'd like more information, write National Tube Division, United States Steel, 525 William Penn Place, Pittsburgh 30, Pa.

USS and National are registered trademarks



National Tube Division of United States Steel

USS

Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors
United States Steel Supply Division, Chicago
United States Steel Export Company, New York

How to pick the right rust preventive

Rust and corrosion of metal parts during manufacture and in storage cost industry millions of dollars every year. Yet this need not be. A simple application of a rust preventive can save untold dollars.

One of the common fallacies that result in rusted or corroded metals is that "any oil" will do. In most cases it will—for a while. But "any oil" is not an effective protector of metal. The formulation of a quality grade of rust preventive is the result of intensive laboratory testing.

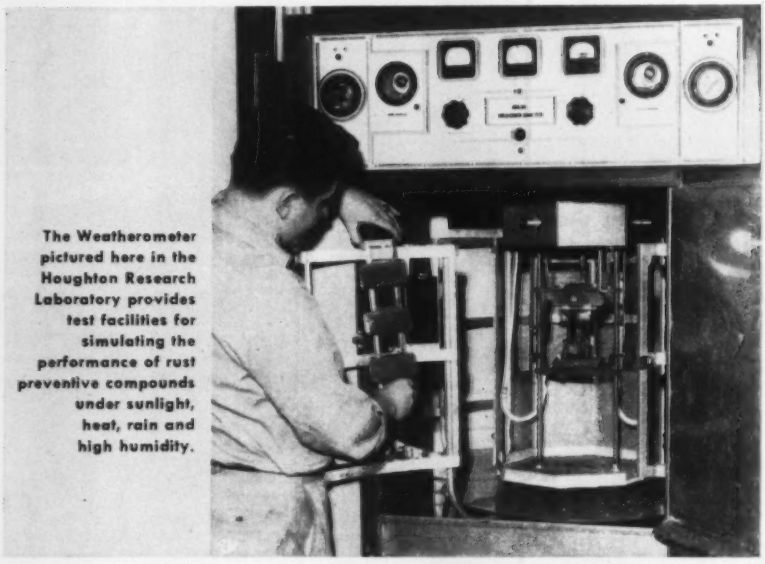
Often a rust preventive must do more than protect against moisture. Sometimes it must be "polar active" —have an affinity for metal that is strong enough to cause it to creep under water on a metal surface and actually raise the water off the surface.

Other Considerations

In certain applications resistance against oxidation is another required property. When oxidation occurs, corrosive materials are formed which attack the metal.

Another consideration is what is to be done with the part which has been protected. If it is to be plated or painted, an easily removed coating is necessary. If it is to be shipped overseas, the coating must withstand salt spray and wide variations in temperature and humidity. If the part or machine is to be exposed to weather—outdoor storage—it must resist the mechanical battering of wind and rain, and the effect of sunlight and variations in temperature.

These are some of the basic considerations involved in picking the right rust preventive for the job. Houghton has been compounding rust preventives since 1869. The familiar name "*Cosmoline*" was introduced by Houghton and is still used to designate government specification rust preventives. "*Rust Veto*" is Houghton's name for its industrial protective coatings.



The Weatherometer pictured here in the Houghton Research Laboratory provides test facilities for simulating the performance of rust preventive compounds under sunlight, heat, rain and high humidity.

Below is a bare outline of facts required in order to determine the right rust preventive for any metal, under any conditions of exposure, which will result in adequate protection at lowest cost.

Among the items which may be required to choose the right rust preventive are the following:

- **Metal to be protected**
- **Type of surface finish**
- **Possible contamination of surfaces**
- **Previous cleaning procedure**
- **Storage conditions**
- **Type of film desired**
- **Fire hazard, if any**
- **Need for removability**

The Houghton Man has a complete questionnaire form for determining the type of rust preventive best fitted for a particular need. Ask him for a copy to be used as a guide in requesting a recommendation. E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.

Houghton

INDUSTRY'S PARTNER IN PRODUCTION

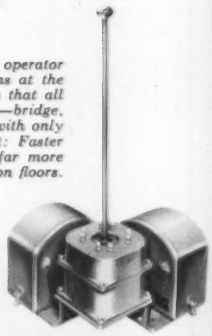
Photo Courtesy Caterpillar Tractor Co., Peoria, Illinois

FOR EVERY APPLICATION, THERE'S ONE CRANE OUTSTANDING...

BUILDING DIESEL ENGINES . . . This P&H overhead crane handles every move in warehousing and shipping these rugged diesels. Harnischfeger's dependable, precision controls enable the crane operator to spot engines safely and accurately; no wasted areas are required for maneuvering as with surface-bound equipment. Result? Air space works profitably for this manufacturer, while non-productive aisleways are reduced to an absolute minimum.

As with every P&H crane application, this installation is specifically engineered for the job. There are no compromises with quality, no questions about performance. Doesn't your plant deserve this kind of equipment for really efficient movement of materials? For more information write for bulletin C68-1, Department 123, Harnischfeger Corporation, Milwaukee 46, Wisconsin.

P&H "joy stick" controller enables the operator to control both bridge and trolley motions at the same time with one hand. This means that all motions, in the desired direction of travel—bridge, trolley, and hoist — can be controlled with only one lever in each hand. Result: Faster control, with less operator fatigue, far more effective load spotting on busy production floors.



P&H
OVERHEAD CRANES

HARNISCHFEGER
Milwaukee 46, Wisconsin

SPOT IT ONCE, SPOT IT RIGHT! ...WITH P&H PRECISION CONTROL!

On this continuous, mass-production diesel engine assembly line, every move has to be right. That's why you'll find teams of P&H Zip-Lift® and Hevi-Lift® hoists at all key locations. They bring engine components up to the work area, then help position heads, manifolds, and other heavy engine parts accurately, dependably, safely to maintain an uninterrupted flow of diesels. Day-in and day-out consistent hoist performance is essential to top production schedules.

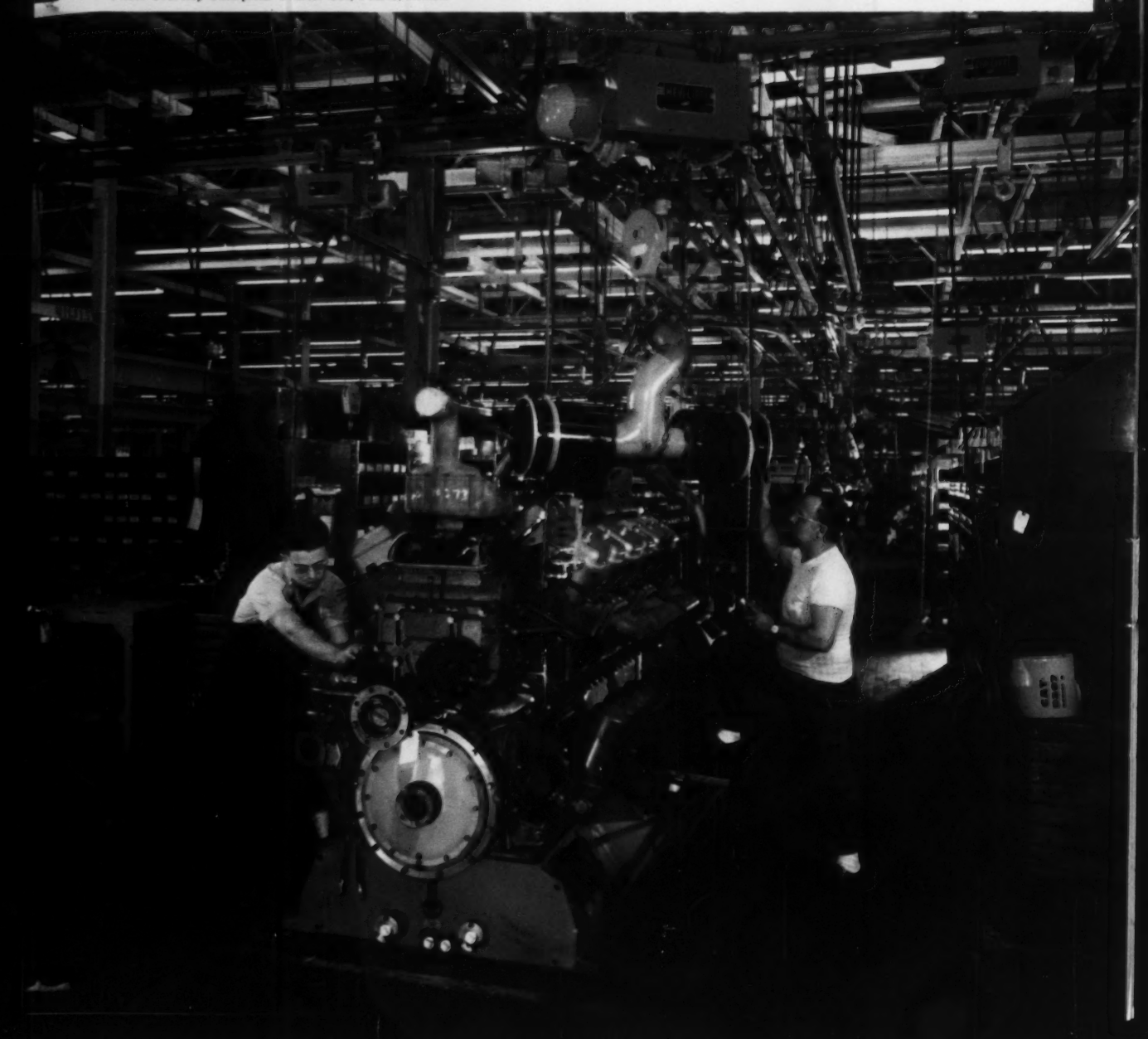
Where hoist performance can have no margin for failure, as on this assembly line, chances are you'll find P&H hoists on the job. Every part — including electrical equipment — is built to P&H quality standards . . . standards that never heard of the word "compromise". Result: years of trouble-free performance for lowest actual lifetime costs of any hoist made today.

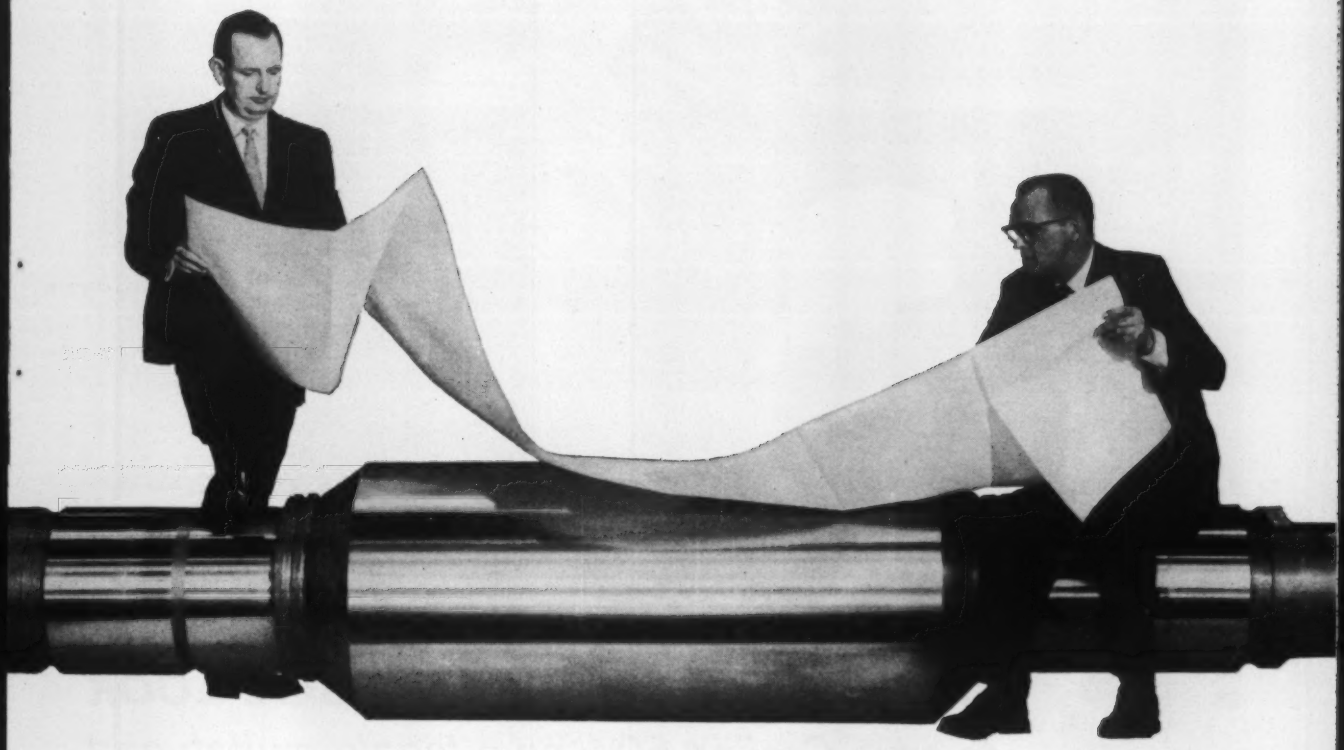
Write today for hoist bulletin H-62, Department 225, Harnischfeger Corporation, Milwaukee 46, Wisconsin.

HARNISCHFEGER
Milwaukee 46, Wisconsin

P&H
ELECTRIC HOISTS

Photo Courtesy Caterpillar Tractor Co., Peoria, Illinois

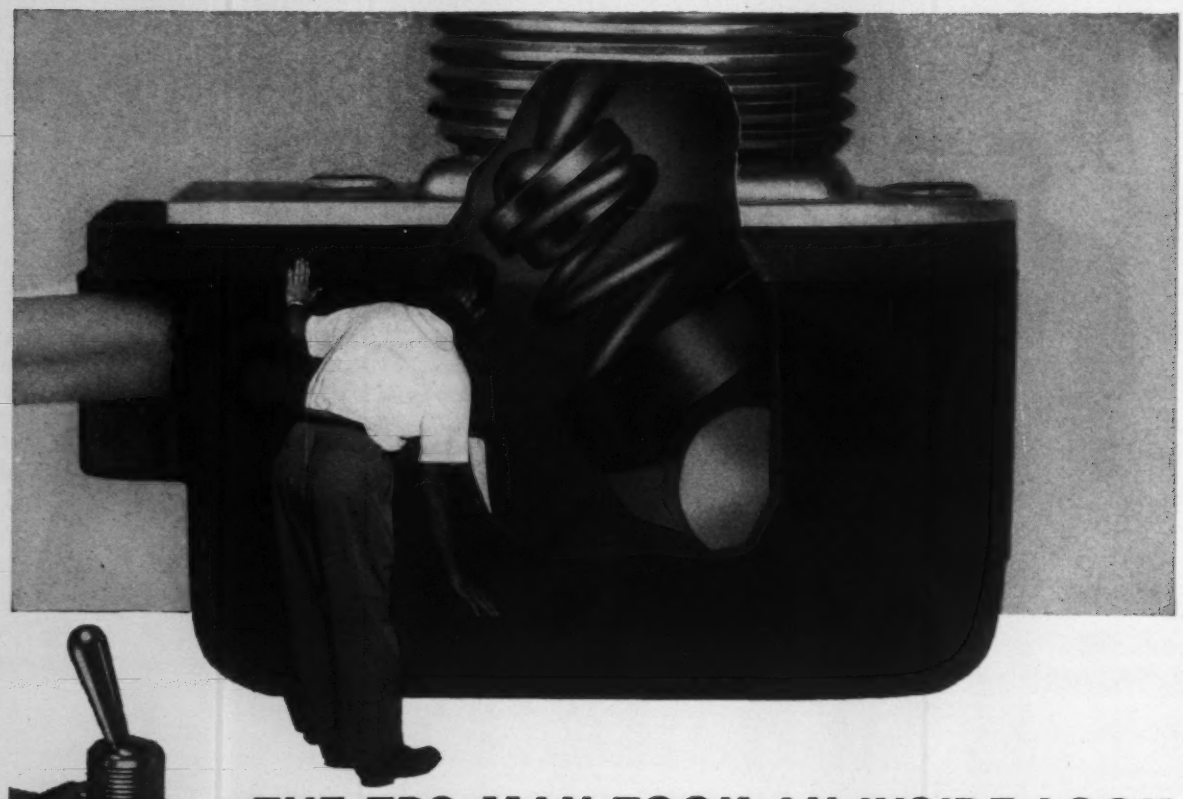




Analyzing history of roll use means future orders are better produced

Through constant following of roll performance, National Roll keeps an accurate log of its rolls in hundreds of applications. These records are carefully analyzed by National's metallurgical and production staffs—discussed with customers by sales representatives such as "Easy" Esary and Bill Williamson, pictured above. Knowing about roll performance, National can make sure a roll order meets specific operating requirements and can assure higher quality with maximum roll service. Analysis of roll performance is just one of the customer benefits available at National, and is one of the reasons we say . . . NATIONAL'S THE GROWING NAME IN ROLLS.

NATIONAL ROLL & FOUNDRY DIVISION
GENERAL STEEL CASTINGS CORPORATION, Avonmore, Pennsylvania
General Steel Castings Corporation, General Offices: Granite City, Ill. Plants: Granite City, Ill., Eddystone, Pa., Avonmore, Pa.
Subsidiary: St. Louis Car Company, St. Louis, Mo.



THE TRS MAN TOOK AN INSIDE LOOK

to save Carling 50% on a toggle-switch part

Carling Electric already used two TRS rivets to assemble snap-acting toggle switches, had no fastening problems for that product. But a stamped brass cap, in the top of each switch spring, kept costs up . . . springs had to be ground flat to seat the cap securely, and costs of brass strip stock, parts inventory, and tool maintenance were high.

Trained in the PAR Process approach to cost reduction, the TRS man saw a way out . . . suggested a dimpled *rivet* in place of the cap, worked out details with Carling engineers. This simple change eliminated spring grinding, stamping tool maintenance, brass strip stock and finished caps inventory. The dimpled rivets improved reliability and smoothness of toggle action, and dependable TRS deliveries removed any need for stocking them ahead of demand. Result: Carling scrapped existing parts inventory, converted to the new design at once.

FIND OUT what the Par Process can save you

The PAR Process aims at lower costs and higher production rates. It starts with a sharp-eyed, production line search by your TRS man, for ways to eliminate or simplify and speed up steps in the assembly — using procedures specially organized by TRS, benefiting from unique TRS developments in rivets and riveting machines.

PAR may bring you better integration and fuller automation of assembly operations, or even a cost-cutting change in design as with Carling. Ask for a check of your operations. Whether your assembly jobs are simple or complex, it can be worth dollars to you.

THE CHANGE THE TRS MAN SUGGESTED

▼ **OLD** stamped cap transmits toggle motion through spring to moveable contact. Requires flat-ground spring to prevent slips and jamming, adds extra costs of strip stock, parts inventory, stamping tool maintenance.

NEW ▶ dimpled rivet does same job better, with precision bearing surface. Sits straight and secure in unground spring, eliminates tool maintenance, removes need for costly in-plant inventories.

Don't Buy Riveting Machines until you learn how the TRS **PAR** *process revolutionizes riveting*

TRS®

TUBULAR RIVET & STUD COMPANY

QUINCY 70, MASSACHUSETTS • **TRS** SALES OFFICES: Atlanta • Buffalo • Charlotte • Chicago Cleveland • Dallas • Detroit • Hartford • Indianapolis • Los Angeles • New York Philadelphia • Pittsfield • Quincy • St. Louis • Seattle. WAREHOUSE IN CHICAGO

See "Yellow Pages" for phone numbers.

If it's a Tubular Rivet TRS makes it . . . and Better

Challenge to Metals

Sobering is a study (Page 77) of trends in per capita consumption of metals and selected competitive materials in the U. S. since 1950.

Each man, woman, and child is using less steel, less copper, less zinc. Only aluminum, among the major metals, shows a gain.

Per capita consumption of plastics is second only to steel. Consumption of glass fibers is up 450 per cent. Cement and rubber show modest gains.

Conclusions must be drawn with care. The basic metals are mature in market status. They reached a high plateau at the beginning of the period. The study ends in 1960, a rather disappointing year for metals.

Plastics are relatively new, and their gain is figured from a lower base. Glass fibers were just beginning to pick up momentum in 1950.

But the fact remains: Metals are being challenged by competitive materials.

During World War II and many of the postwar years, demand for steel and other basic metals was great. It often outstripped capacity. Producers were first concerned with supplying what was needed. When the pressure subsided slightly, they were content to participate in a satisfactory market. They tended to regard the market as established.

Producers of the newer nonmetallic materials—and some, like cement, not so new—were more aggressive in their marketing approach. They were more aggressive in their research and development. They developed new applications and won markets—often at the expense of metals.

The results show in profitability studies. Rubber, glass, and cement producers are earning a higher return on investment than are steel and nonferrous metals producers. The results show in a modest shrinking in metalworking's share of our national output and in metalworking's share of total manufacturing employment.

Happily, producers of metals are taking cognizance of the problem, and some are attacking it with intelligence and vigor. They are fighting for a larger share of the total materials market with new ideas, new uses, and more aggressive promotion and marketing.

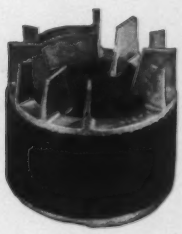
So our study is sobering, but not alarming.

Walter J Campbell

EDITOR

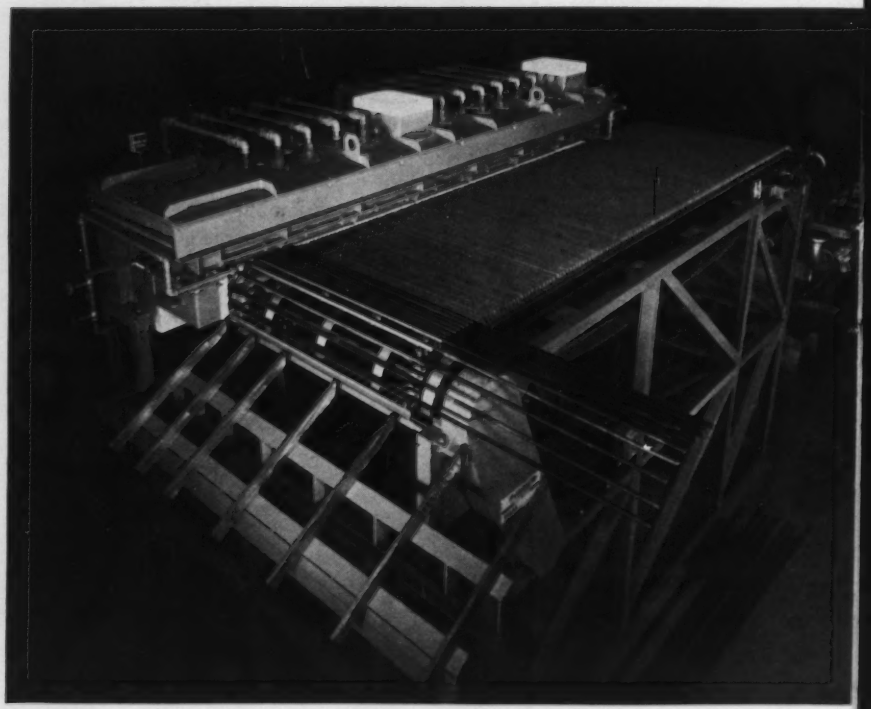
NEW SLANTS ON HEAT PROCESSING FROM SELAS

here's how industry cuts costs... Selas Heat Processing

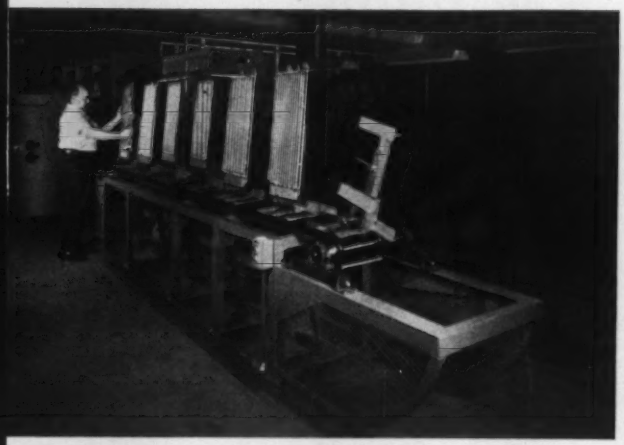


POST HEATING: *Die-cast aluminum rotors for electric motors are post-heated in this continuous, automated Selas machine, to improve electrical characteristics. Occupying floor area only 7 feet square, this machine provides also a fast, convenient method for shrink-fitting rotors to shafts, and replaces both manual heating and a press-fitting operation.*

HEATING FOR HOT WORKING: *End-heating prior to hot heading, this Selas automated machine heats 5 inches at one end of steel bars, ¾-inch diameter by 108 inches long, to 2200° F. quickly, uniformly, and with a sharp heat line. This equipment has enabled its user to double his production rate to 2640 pieces /hour without additional labor.*

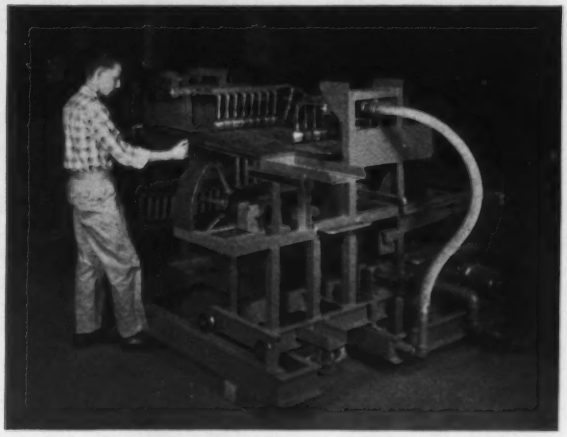


improves product quality with Equipment



BRAZING AND SOLDERING: *An automotive product operation requires the aluminum soldering of aluminum return bends to aluminum flared tube ends of finned condenser coil assemblies. This Selas automated continuous straight-line unit uniformly solders 180 assemblies/hour in six different intermixed sizes.*

SELECTIVE HARDENING: *Baking pan grouping strips of SAE #1025 formed steel are selectively hardened on this continuous, compact Selas machine. Complete with integral water-spray quench, it occupies an area approximately 6 x 7 feet and processes 1200 pieces/hour.*



These installations are typical of how Selas *automated* heat processing equipment

- Cuts operating costs
- Increases production rates
- Minimizes in-process inventory
- Reduces labor requirements
- Saves valuable floor space
- Improves product quality

Specifically designed and custom-built to meet your individual production requirements and job specifications, Selas automated heat processing equipment employs time-proven standardized engineering features for longtime operating dependability and minimum initial investment. A Selas field engineer would welcome the opportunity to survey your requirements . . . at your convenience. No obligation, of course. For this free personal service, or for literature on any of the heating operations shown here, write to Mr. W. B. Troupe, General Industry Division.

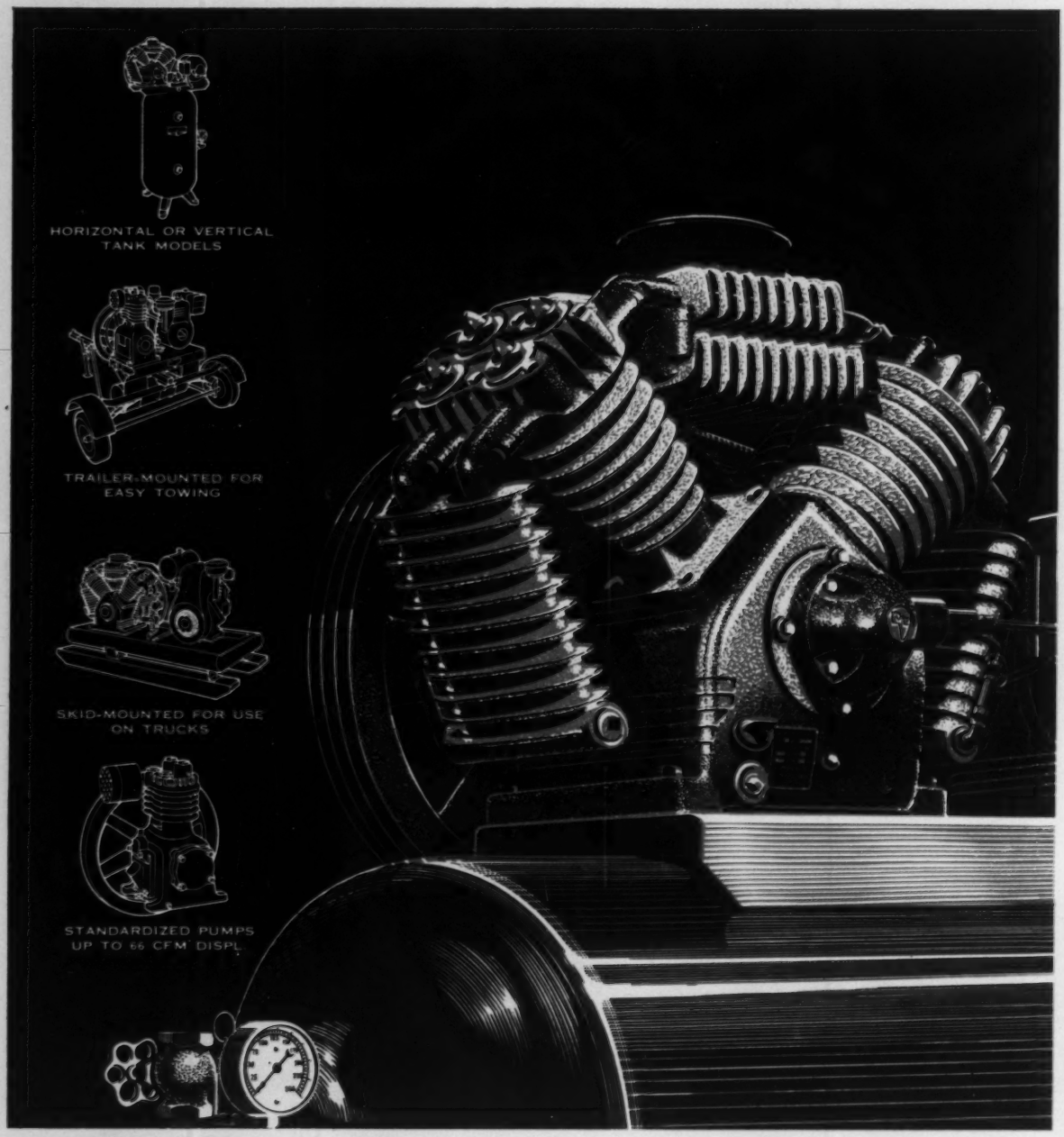
SELAS CORPORATION OF AMERICA
22 Dreshertown Road, Dresher, Pa.

EUROPEAN SUBSIDIARY: Selas Corporation of America, European Div., S.A., Pregny, Geneva, Switzerland. **INTERNATIONAL AFFILIATES:** FRANCE—Societe Exploitation de Produits Industriels, Paris; JAPAN—International Machine Co., Ltd., Tokyo.

SELAS

HEAT AND FLUID PROCESSING ENGINEERS

DEVELOPMENT
•
DESIGN
•
CONSTRUCTION

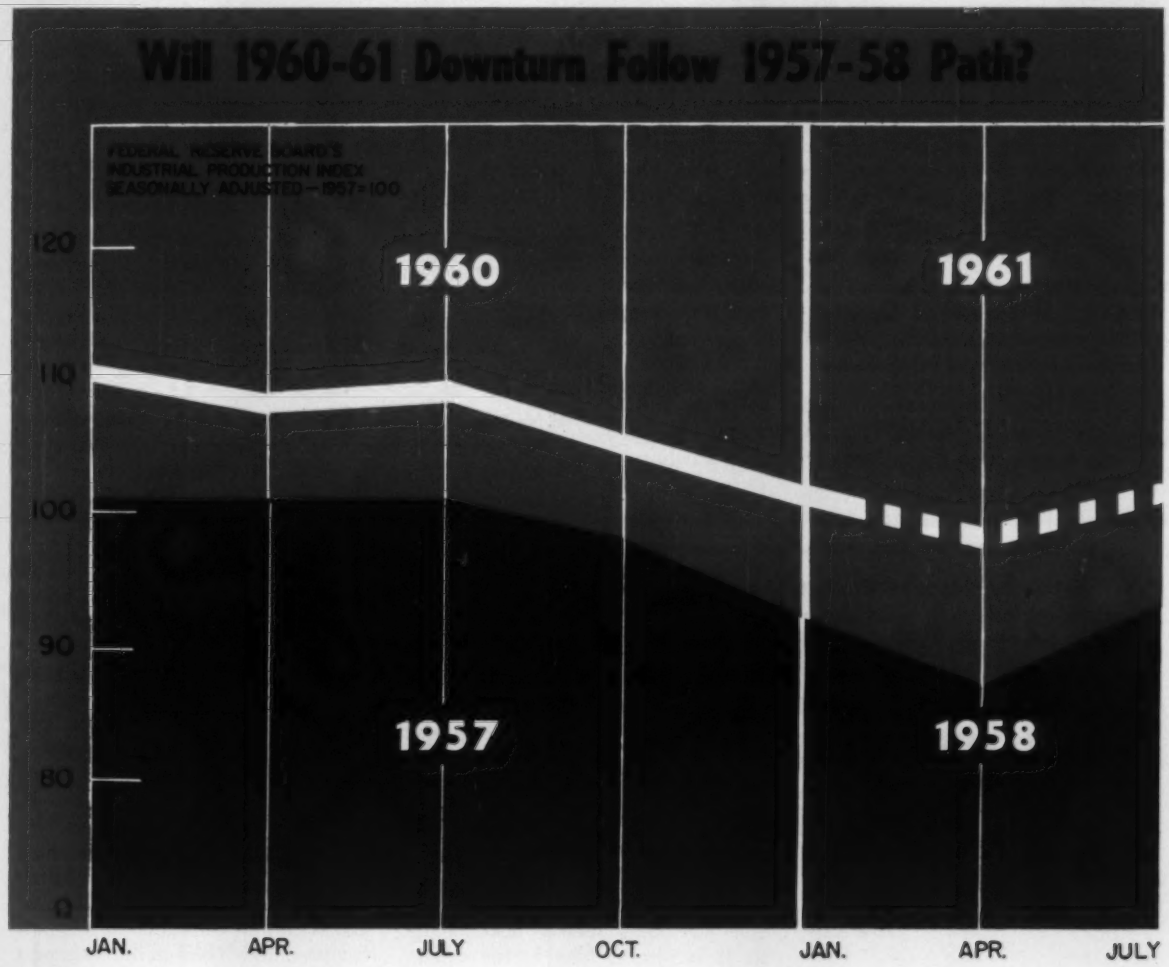

HORIZONTAL OR VERTICAL TANK MODELS
TRAILER-MOUNTED FOR EASY TOWING
SKID-MOUNTED FOR USE ON TRUCKS
STANDARDIZED PUMPS UP TO 66 CFM DISPL.

air compressors from DeVilbiss have greater finned cooling area, give you more air per power dollar. They're part of DeVilbiss' complete line of matched equipment for coating and finishing that includes: spray guns, automatic spray, dip and flow coaters, spray booths, air and fluid hose, ovens, spray washers, air-replacement units, dust collectors, complete "turn-key" finishing systems.

Talk to DeVilbiss about all your compressed-air needs thru 25 hp.

FOR TOTAL SERVICE, CALL
DEVILBISS

THE DeVILBISS COMPANY, Toledo 1, Ohio. Also Barrie, Ontario; London, England; São Paulo, Brazil. Branch offices in principal cities.



Dotted line indicates STEEL estimate.

How Much Bounce in Spring Upturn?

THE ECONOMY and ball players in training have a lot in common these days: Both are full of aches and pains, but both will improve as the weather warms up.

The turn for the better in the economy could come in the middle of the second quarter, believe economists, government officials, and industry executives.

An assist is expected from a speed-up in federal and state spending.

The Kennedy administration has revealed it is making immediately available $350 million in appropriations that would not have been on tap until the April-June quarter. The money will be used for grants to schools for construction, to states for hospital construction, and communities for plants to combat water pollution. As part of the accelerated program, more than $700 million in federal aid funds for highway programs, also formerly earmarked for the second quarter, is being made available now. President Kennedy has urged state governors to expedite all state and local projects that are genuinely useful and will provide immediate jobs and business help.

• **Faster Spending**—At least $250 million in contracts will flow from the Department of Defense before June 30. They were scheduled for release in fiscal 1962, which begins, July 1. Defense heads will also ask Congress for permission to contract for $500 million in military construction that was set for award in 1962. The Interior Department's Bureau of Reclamation has put its Denver design staff on a 58 hour week to speed contract awards for construction and equipment. (Speed-ups will amount to ten months in some cases, say officials.) Small Busi-

Component industries are good barometers. Here's what . . .

Associations Report on Business

- **Gray Iron Founders' Society**—January operations at 58 per cent of capacity, up 7 per cent from December's and 5 per cent from November's . . . March looks like the turning point . . . by June we'll be moving pretty good.
- **Drop Forging Association**—The operating rate for 1960 hit 51 per cent of capacity . . . fourth quarter, 1960, sales topped third quarter's by 13 per cent . . . further improvement is expected.
- **Pressed Metal Institute**—Shipments in January 8.2 per cent over December's . . . Chicago and New England areas lead the industry, with only Michigan lagging.
- **Industrial Fasteners Institute**—No sound indicators . . . February orders steady but below January's.
- **National Screw Machine Products Association**—All short range indicators point down . . . shipments in the last quarter of 1960 were 12 per cent above the average for 1958.
- **Steel Service Center Institute**—February performance holds promise of slow steady rise in the first quarter . . . the second quarter is expected to see a sharper demand spurt.
- **Steel Founders' Society of America**—Production of medium and small castings up about 15 per cent in January vs. the last quarter of 1960 . . . construction equipment people are building inventories . . . The upturns: Midyear in this group, third quarter in railway specialties, midyear for large castings.
- **National Tool & Die Manufacturers Association**—For the third month in a row, orders received continued their mildly encouraging upward trend . . . December was 3 per cent higher than November, 10 per cent above October, and 23 per cent over 1960's low in September.
- **American Gear Manufacturers Association**—We're bumping along on a plateau—victims of the profit squeeze . . . from the shape of our booking curve, it looks like six months before we'll experience a business upturn.

---

ness Administration personnel have been directed to step up all SBA programs, particularly in labor surplus areas.

White House officials have revealed that discussions are underway to determine whether new appropriations are needed for the April-June quarter to replace the money moved up into the current quarter. The Eisenhower estimate for government spending in the current fiscal year was $78.9 billion, with a predicted surplus of federal receipts over expenditures of $79 million. A deficit of about $1 billion is now expected in fiscal 1961. Accounting for the change: Increased spending under the new administration (perhaps $750 million) and a decline in expected excise and corporate tax receipts (about $250 million).

• **Consumer Benefits**—A House bill (H. R. 3864), would extend federal aid to the unemployed who have exhausted their state benefits. The bill, almost certain to pass in some form, would pay out $950 million over the next year or so. It would give additional weekly benefits up to 13 weeks, as long as the extension does not amount to more than 50 per cent of the state plan. Only those people living in a state which has a 26 week plan would receive the maximum of 13 weeks. About 1 million people would benefit immediately. Labor Department economists estimate that another 3 million will exhaust their benefits after Apr. 1.

A quicker payout is slated for $250 million in dividends to ex-GI's who hold National Service Life Insurance. Another factor: Almost immediate returns of income tax refunds are promised.

• **Depressed Areas**—President Kennedy sent Congress a bill that would provide financial help for areas of chronic unemployment seeking to attract new industry. It would set up a $3 million revolving fund to buy local bonds and make loans to areas buying land for buildings or constructing public facilities. It would also provide $75 million in grants for construction of public facilities and $14.5 million a year in appropriations to give technical assistance to the areas and weekly subsistence payments to workers being retrained. The program would be administered by the Commerce Department, rather than the independent agency favored by many lawmakers.

• **What Barometers Say**—The Federal Reserve Board's Industrial Production Index fell only 1.1 points in January to 102.1. (That's 15 per cent above the last recession's low in April, 1958.) It normally fluctuates 1 or 2 points during the first few months of each year, and some economists say the fact that the index didn't plummet is hopeful.

The drop in durable goods manufacturing has slowed significantly. The index read 98.0 in November, 95.8 in December, and 94.5 in January.

A highly placed government

economist summarizes the outlook for STEEL, saying: The bad weather has clouded the picture for the economist who normally holds great faith in the business barometers. He doesn't know to what extent the weather has manipulated the indexes out of the expected pattern of the recession. The government is watching two barometers especially; New orders of manufacturers and personal income.

The only available new order figures, released ahead of their normal date to reassure businessmen: In January, new orders received by manufacturers of durable goods were 2 per cent, $200 million, under December's. The total (at the seasonally adjusted annual rate) was $13.1 billion. From November to December, new orders fell $300 million. Those figures compare with a 6 per cent drop from September to October.

• **Refreshing Index** — In January, personal income fell only $600 million. It skidded $2.1 billion from November to December. A February turnaround in new orders and personal income will augur well for a spring upturn. Chances will be even better if automobile sales and construction expenditures show good increases. The turn could be called by Mar. 31, when February new order figures are made available. (Look for the Commerce Department to release them early if the figures are hopeful.)

Indications of a pickup in housing starts come from the Commerce Department. Construction of new houses rose 12 per cent in January after hitting bottom in December. However, part of that gain was due to starts delayed by bad weather in December.

• **Reports from Industry**—Ray Eppert, Burroughs Corp. president, says he's convinced that 1961 will wind up a better business year than 1960. He told STEEL: "Our nondefense orders have been rising steadily for the last four months. I don't know whether they'll continue to rise, but I am sure that 1961 will be better than 1960. And I think it's better this way. If 1960 had been as profitable as early forecasts indicated, we might have had an even greater reaction this year."

E. B. Germany, president and chairman, Lone Star Steel Co., announced that his company has had an increase in orders since the first of the year and noted that 1000 of the 1500 men laid off at one time last year have been rehired.

Prospects for the steel industry in 1961 are for a gradual, unspectacular improvement in demand throughout the year, says Russell L. Peters, financial vice president, Inland Steel Co., Chicago. The outlook: Steel production for the year should be about the same as 1960 output—close to 100 million ingot tons.

• **Blough Encouraging** — For the period immediately ahead, Roger M. Blough, chairman, U. S. Steel Corp., sees a pickup for tin plate. Summer will bring improved demand in construction and steels used in building, he said. He predicted also a seasonal improvement from auto producers, perhaps as early as March.

With auto producers blaming bad weather, in part, for the sales slowdown, there's hope that a week of sunshine will perk up sales and production.

Reflecting a pickup in the manufacture of farm machinery, construction equipment, and trucks for the spring trade, International Harvester Co. recalled 3442 workers in January. Employment of production and maintenance workers on Feb. 1 totaled 39,112, the highest since last July. January was the second consecutive month that the company's payrolls increased.

President Names Members to Labor-Management Panel

EXPECT this result from President Kennedy's Advisory Committee on Labor Management Policies:

The panel will help drive home the basic economic fact that wage gains should be related to increases in productivity. Public pressure will be brought to bear on unions that step outside the bounds of realism in their demands.

That's the consensus of personnel executives contacted at the Mid-Winter Personnel Conference of the American Management Association in Chicago. Most felt that the panel would have little direct effect on labor negotiations.

Commerce Secretary Luther Hodges, who'll head the committee next year, is doing his best to counteract stories that the administration is aiming for price controls. He told STEEL: "It is not the intention that we go down that road. It's false conjecture to see price controls in the committee's makeup.

Labor Secretary Arthur Goldberg will head the committee this year. Others are listed at right.

Management—Thomas Watson, president, International Business Machines; Joseph L. Block, president, Inland Steel Co.; Henry Ford II, chairman, Ford Motor Co.; J. Spencer Love, chairman, Burlington Mills; John Franklin, president, United States Line; Richard Reynolds, president, Reynolds Metals Co.; Elliot Bell, editor, *Business Week*.

Labor—George Meany, president, AFL-CIO; Walter Reuther, president, United Auto Workers; David Dubinsky, president, International Ladies Garment Workers; George Harrison, president, Railway Clerks; Thomas Kennedy, president, United Mine Workers; Joseph Keenan, secretary-treasurer, International Brotherhood of Electrical Workers.

Public—Ralph McGill, editor, *Atlanta Constitution;* George Taylor, professor, University of Pennsylvania; Clark Kerr, chancellor, University of California; Arthur Burns, chairman, National Bureau of Economic Research; David Cole, labor arbitrator from Paterson, N. J.

How Reliable Are Your Venders?

Ronald Griffin (left), quality control analyst, reviews a vender's performance with inspection foreman

POSE THAT QUESTION and you may find, like Twin Coach Co. did, that you aren't sure. You'll probably also find that you *can* pinpoint vender reliability and save money in the process if you work at it.

That has been Twin Coach's experience with a simplified vender reliability rating system that has brought:

- Savings exceeding $50,000 in inspection costs at the receiving level.
- Parallel savings in costs of handling rejects and follow-up on poor service.
- Fewer production line rejects and reworks.
- Reduced paperwork costs on shipping, handling, and related operations.
- Less machine downtime and other production holdups due to faulty parts.
- Improved quality control.

(Previously, Twin Coach's check on the quality of vender products was by the tried but not so true method of 100 per cent inspection of incoming parts. That inspection procedure had the obvious drawback of being time consuming. Further, since parts inspection was boring and fatiguing, people tended to become careless and allow defective parts to slip through. Twin Coach also found vender reliability was pretty much a matter of memory as to which vender was or wasn't consistently delivering a satisfactory product. Management decided the system didn't incorporate the necessary follow-through to assure that suppliers who were lax would either start delivering a quality product on time or give way to someone who would.)

• **The New System**—Twin Coach's answer is a two-pronged program that: 1. Substitutes random sampling for 100 per cent inspection. 2. Provides accurate and up-to-the-minute vender performance records.

Under the sampling procedure, a small portion of incoming material goes through an intensive inspection.

The way in which the sample is selected and the method of evaluating inspection results are controlled by a formula devised by the government. Under the system, an entire shipment can be rejected or accepted. Intensity of inspection varies from component to component (depending on its complexity) and supplier to supplier (depending on his past record).

• **Inspection Speeded** — Sampling has paid off! says W. H. McClure, quality control manager. Fewer defective parts now find their way into the production line. The number of inspection personnel has been reduced by a third. Incoming material gets through receiving-inspection in less than two days compared with an average of six days before.

A vender has to have a history of operating at a high level of ef-

How Twin Coach Measures Reliability

THE FORMULA

$$R = 100 - \frac{(X^1 - X^2)}{A} + X^2$$

KEY

R—reliability.

X^1—percentage of discrepant parts (both critical and noncritical defects).

X^2—percentage of parts rejected (defects critical enough to warrant return to vender).

A—an arbitrary factor taking into account the complexity of a part and effort that goes into making it. Example: A part requiring extensive machining is given an "A" factor of 2.0. A simple-to-make part gets an "A" factor of 1.5 since it should be produced with little or no error.

APPLYING THE FORMULA

To calculate reliability: Divide the difference between the percentage of discrepant parts and the percentage of rejected by the "A" factor; add the percentage rejected. Subtract the result from 100 per cent.

EXAMPLE

Discrepant 10 per cent, rejection 5 per cent, "A" factor 2.

$$100 - \frac{(10 - 5)}{2} + 5 = 92.5\% \text{ Reliability}$$

ficiency before batch sampling becomes most effective. That is where adequate inspection records come in. They show when it is feasible to reduce the intensity of inspections, and conversely, when inspections should be stepped up to protect the company against poor quality.

• **How Venders Are Rated**—Here is a step-by-step rundown on how Twin Coach established its vender reliability rating.

Each day, shipments that have been processed through receiving-inspection are recorded on a daily log sheet. Each vender's name, the shipment number, and the quantity processed and quantity rejected are recorded. (Products are assigned to seven categories: Machined parts, standard shelf items, chemicals, forgings and castings, raw stock, template inspection, and plating).

Quantities processed are recorded daily on a file card for each vender. A grand total of parts processed is recorded on the cards at the end of a month.

Vender rejections are checked against the daily log sheet. The quantity discrepant (all defects whether minor or critical) and the quantity rejected are recorded at the bottom of the rejection report. Only rejections that can tie in with the exact lots on the daily logs are checked, providing assurance that the discrepancies in a vender's product are assigned to the specific month's rating period for a more accurate reliability measurement.

When a vender is delinquent in sending required affidavits, the number of days hold time for each lot is recorded at the bottom of the rejection reports.

At the end of each month, a report on each vender is prepared which lists: Parts processed, percentage of those that were discrepant, percentage that were rejected.

Finally, the vender's reliability rating is computed using the formula outlined above.

From this rating is subtracted an additional 0.5 per cent per day penalty for each day (beyond the third day) that a supplier is late in sending in his material certification affidavits.

• **Better Control**—"Each of our venders now knows where he stands in relation to other venders," explains Mr. McClure. "And we can now spot vender problems as they occur and can move quickly to correct them."

When the records show a supplier is having trouble, a Twin Coach quality engineer is sent to his plant to help analyze the cause and to then recommend corrections. If there's no improvement, the supplier is dropped.

Today, 98 per cent reliability is considered "acceptable performance" by Twin Coach. "Tomorrow that may easily not be good enough," says Mr. McClure.

How to Make Your Plant Safer in the Winter

OCCUPATIONAL hazards in industry are multiplied many times in winter.

When men working outside get cold, they become uncomfortable. They are less likely to have their minds on safety. They become less alert.

Frank R. Barnako, manager of compensation and safety, Bethlehem Steel Co., offers these tips to help cut wintertime accidents.

- Provide convenient warming areas where men can take refuge from time to time. Long exposure to bitter weather without respite can be exhausting.
- Instruct operators of mobile equipment such as trucks, locomotives, and cars to be doubly cautious. Ear muffs make hearing difficult; blowing snow cuts visibility.
- Develop snow fighting crews and have them ready to move into assigned areas to keep walks, roadways, railroad tracks, and switches open when the storm strikes. Be sure steps are taken to remove ice from power lines, transformers, exposed pipe, conduit lines, and gas mains to prevent interruption of utility services. High winds may cause power lines to rub together, fraying insulation and creating short circuits.
- Keep fire fighting equipment and crews at peak efficiency. Maintain regular fire patrols, with systematic checks of alarm and sprinkler systems and inspection of potential danger spots like stair wells, elevator shafts, and rubbish bins. Hydrants should be promptly shoveled out and thawed if they freeze up.
- Maintain close control of smoke and fumes in enclosed areas to avoid carbon monoxide concentrations.
- Emphasize extreme care in the operation of cranes and power equipment during cold weather. Controls may be slower in responding because oil and grease stiffen in bearings, gears, and journals.
- Guard against falling icicles. They can cause serious injury. Accumulations of ice can also damage gutters and roofs, requiring expensive repairs.
- Be sure due caution is used when ice and snow covered gondola and hopper cars are brought into the plant. Assure secure footing for employees who must work on them. It's often necessary to thaw frozen ore or other materials with gas torches.

- **More Tips**—"The key to successful safety programs lies in the attitude of management," emphasizes Mr. Barnako. "Every man in the organization takes his cue from this—he'll attach the same importance to safety as he feels top brass does."

Enforcement and safety education go hand in hand. There should be no letup in regular safety meetings. "In the grip of winter's cold, renewed emphasis on education will pay dividends," the safety executive says.

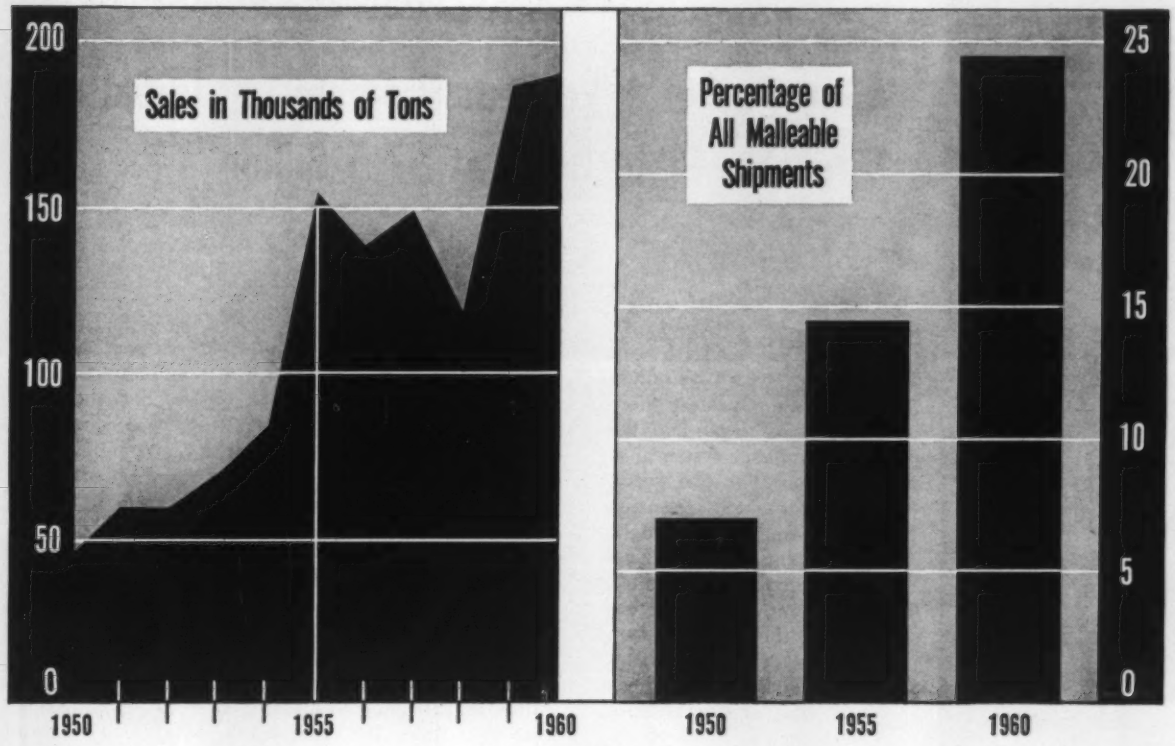
Suggests Mr. Barnako: "A well rounded safety education program should include emphasis on off-the-job hazards too." This includes how to drive on icy and snow covered streets, use of snow tires and chains, how to avoid being overcome by carbon monoxide in an automobile, avoidance of overstrain from shoveling snow, and how to maintain safe conditions in the home.

Oswego Gets Aluminum Mill

A site near Oswego, N. Y., has been selected as the location for a $30 million aluminum hot rolling mill to be built and owned by Aluminium Ltd., Bridgeport Brass Co., Cerro Corp., and Scovill Mfg. Co. The project was originally announced in October, 1960.

The plant will have an estimated capacity of 100,000 tons a year for the production of aluminum reroll stock—heavy gage sheets that can be reworked into lighter gages at the sheet mills of the four companies.

Construction will begin within the next few months and is expected to take two years to complete.



Pearlitic Malleable Iron Sales Climb

CRACKING the auto market with crankshaft applications has been the key factor behind the sales surge in pearlitic malleable iron.

Three new GM compacts—the Oldsmobile F-85, Buick Special, and Pontiac Tempest—have pearlitic crankshafts. The applications helped the $75 million industry hit a new high in shipments last year—an estimated 190,000 tons, says the Malleable Founders' Society, Cleveland.

GM's Pontiac Div. focused attention on pearlitic malleable castings in 1955 when it introduced the material in crankshafts. Since that time, the industry has made inroads with most of the automakers—Chrysler, for example, has increased its usage from 7 to 30 lb per car.

Other applications include torsion bar arms on heavy duty trucks, idler and camshaft gears in engines, and components for the split driveshaft on the new Buicks.

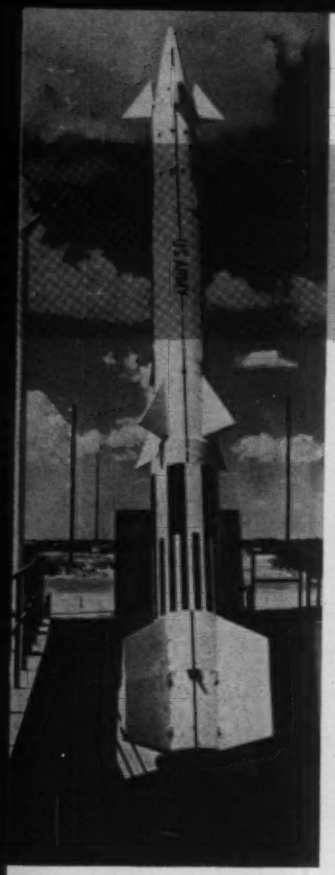
Other Uses—In nonautomotive fields, pearlitic malleable cranks are used in outboard motors, lawn mower engines, ordnance hardware, farm machinery parts, shotgun frames, and heavy equipment components.

Pearlitic malleable is produced in much the same way as the standard grades of malleable: The procedures differ either in the last stages of heat treatment or through alloy additions to the melt. They create a matrix which contains a small amount of combined carbon, and the result is a stronger, harder, yet sufficiently ductile material. The castings are easy to machine and harden (via simple heating and quenching procedures).

Prior to World War II, pearlitic malleable shipments were only a minor specialty of the malleable industry. By 1950, the material accounted for about 5 per cent of total shipments—last year, the figure rose to 25 per cent. MFS officials predict that pearlitic malleable sales should climb to 235,000 tons by 1965 and 285,000 tons by 1970.

Foreign Automaker Orders High Speed Engine Line

Detroit production men are talking about the high degree of automation that's going into some of the foreign auto plants. They're citing an order Opel reportedly placed with Ingersoll Milling Machine Co., Rockford, Ill., for a transfer line that's more than 600 ft long, will turn out engine blocks at high production rates. STEEL sources say Ingersoll was given the entire responsibility for the line, plus a machine that mills locating surfaces on raw castings, plus a transmission line that includes high production rough and finish grinding stations.



Army Pushes Nike Zeus Program . . . Initial Estimates Place Costs at $7.5 Billion

METALWORKERS are watching with restrained enthusiasm the latest effort of the Army to put its Nike Zeus antimissile system into production. For two years, the Army's top scientists and generals have thought the weapon should at least be produced on a limited basis to prove out the theory, but they haven't been able to get the go signal from men like Dr. Herbert York, boss of the Defense Department's Research & Engineering Office.

Firms like Western Electric, Bell Telephone Laboratories, Douglas Aircraft, Thiokol, and Sperry Rand already have a big stake in the project; hundreds of others would be involved in a production effort designed to put the system into operation in five years. A conservative estimate of the cost is $7.5 billion, but it could cost twice that.

The big push is being made this year by the Army because of two political situations: 1. A new administration supposedly dedicated to an increased defense posture. 2. Growing rumors of a similar system being rushed to completion by the USSR.

Army sources admit that even if we began production today, chances are the Russians would have a system as soon as we. But if we wait, the Army foresees the day when the Kremlin will demonstrate a defense system capable of destroying ICBMs and making our diplomatic posture almost untenable.

● **FULL TESTS BY '62**—A complete, three stage Nike Zeus, triggered by its complex radar tracking and control systems, will be fired soon from Point Magu, Calif. Next year, a Nike Zeus will be launched from Kawajalein Island in the Pacific Ocean to intercept an Atlas missile (launched from California) speeding back into the atmosphere at 18,000 mph. The Zeus will "neutralize and destroy the incoming atomic warhead without detonating it."

The Zeus was funded for about $275 million in the fiscal 1961 budget; another $250 million or so is in the Eisenhower fiscal 1962 budget. Congressmen are being told by the Army that an additional $175 million is all that is needed to start the five year production cycle and complete the final research and development work. It is difficult to estimate Congressional attitudes toward the program, but there appears to be a shift in favor of it. Two speeches have been made recently on the floor of the Congress; support is coming from members of the House Science & Astronautics Committee.

● **NO UMBRELLA**—The Army does not claim the Zeus to be an umbrella over the continental U. S. Instead, it is a terminal system, designed to stop up to perhaps 100 warheads from reaching U. S. targets at 2 second intervals. That defense capability is enough for the decade, says the Army, because of the difficulties in launching so many missiles at the same time. Our own Atlas, for example, the best we have, rates only 48 per cent in reliability, says Rep. Overton Brooks (D., La.), chairman of the House Science Committee.

Human or technical error bothers Army strategists the most. Sometime during the next decade, they see one or two missiles launched against the U. S. by mistake.

In case that happened, a Nike Zeus system would forestall a catastrophe easily. While Zeus was in action, the launching country would have time to report its mistake before we triggered our retaliatory missiles and plunged the world into its last war.

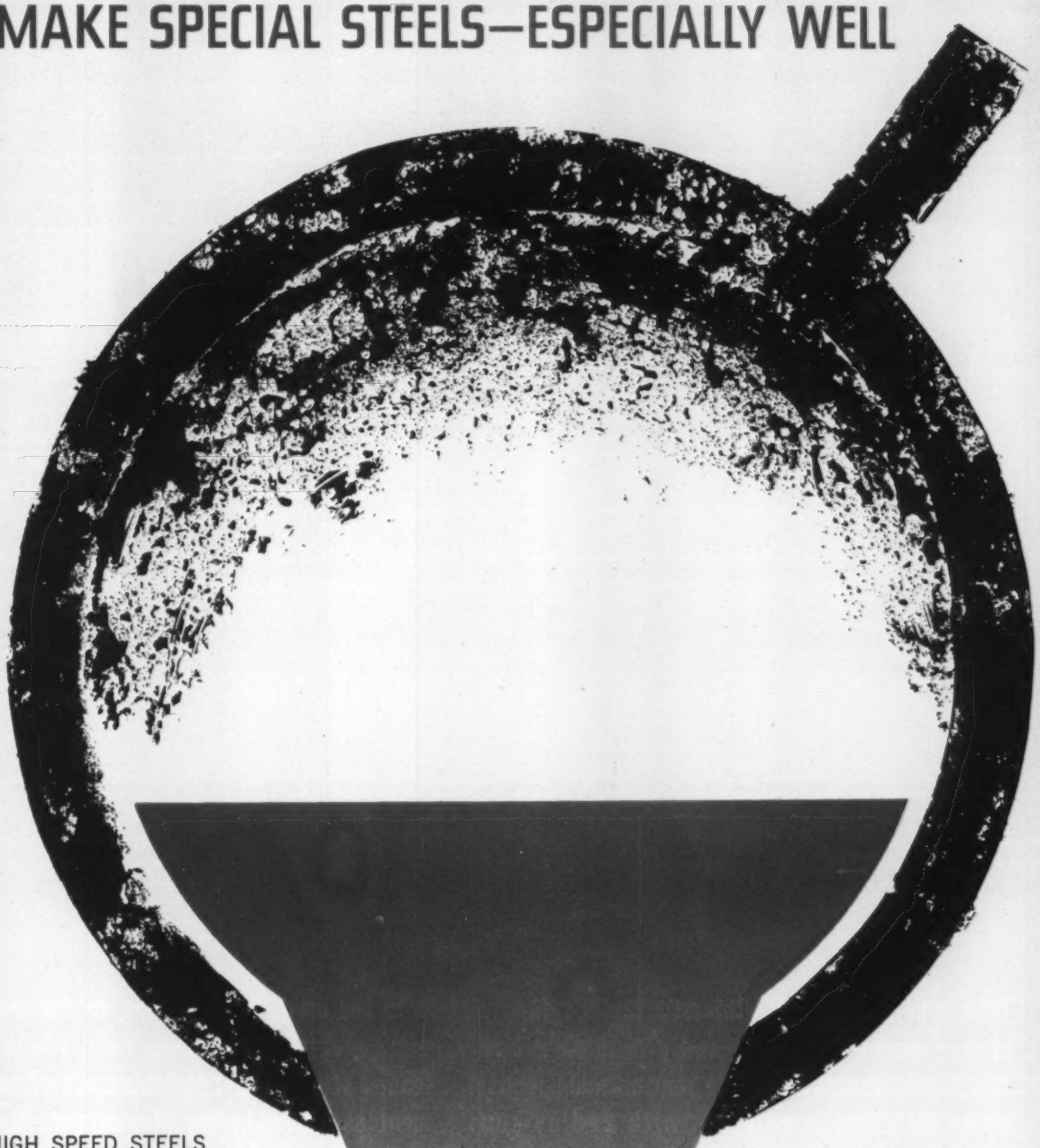
● **NO OTHER PROGRAM**—Only one other program in the Defense Department is designed to attack the missile defense problem: Project Defender, run by the Advanced Research Projects Agency. It is conducting mostly paper studies in advanced physics. Zeus is the only practical piece of hardware available to us for ten years, concludes the Army.

This "most complicated system man ever conceived" has had "the highest national priority" possible for the last two years, and, says the Army, is on schedule. In the last year, progress has been made in developing better radar while cutting down costs. The problem of decoys destroying the Zeus's effectiveness does not appear as formidable as it did a year ago, because the Zeus system is making the right sort of decoys "harder to build" than was thought. The "virtually automatic" system will work without any warning time, admits Dr. York, but the question is "whether the Zeus will work at all."

Dr. York wants to wait for the Pacific tests next year.

The Army wants to start production now to gain at least two years' time.

WE MAKE SPECIAL STEELS—ESPECIALLY WELL



HIGH SPEED STEELS
TOOL STEELS
STAINLESS STEELS
ALLOY STEELS
FORGED ROLLS
EXTRUSION PRESS PARTS

MARATHON

SPECIALTY STEELS, INCORPORATED

A Division of Deutsche Edelstahlwerke A. G., Krefeld, West Germany DEW 375 Park Avenue, New York 22, N. Y.

Take a Ledloy steel—Inland's famous family of free machining steels—and give it all you've got! Go on—double and triple your normal speeds. Up to 325 sfm is common with Ledloy and believe us, far greater speeds are perfectly possible—up to 450 sfm with high speed tools —600 sfm with carbide tooling. ■ Step up the feed, too. Drill at 40 inches per minute at 750 rpm if you have the equipment for it. Matter of fact, you can't tell how much faster—better—you can do with a Ledloy steel 'til you've pushed it to the limit. ■ One thing to remember—you won't get these amazing results with just any leaded steel. To get the most out of your equipment, use Inland Ledloy—the original leaded steel. ■ That's right—Inland made leaded steels long before anyone else—has been developing the unique properties of Ledloy steels for more than 20 years—can recommend exactly the right type for your shop and your product. So use Ledloy steels—hit them with all you have...

LEDLOY® STEELS CAN TAKE IT!

the world's most machinable steels

INLAND STEEL COMPANY

30 West Monroe Street • Chicago 3, Illinois

INLAND®

Metals vs. Nonmetals: How Per Capita Use Compares in U. S.

	STEEL Pounds per Capita	ALUMINUM Pounds per Capita	COPPER Pounds per Capita	PLASTICS Pounds per Capita	CEMENT Barrels per Capita	RUBBER Pounds per Capita
1960*	796	24.4	12.7	34.2	1.782	23.1
1959	816	25.0	13.3	33.2	1.908	24.2
1958	677	21.6	13.3	26.0	1.780	19.5
1957	886	21.6	14.5	25.2	1.704	22.6
1956	956	22.0	16.3	23.6	1.782	22.8
1955	990	22.2	16.2	22.6	1.793	24.9
1954	755	21.6	15.2	17.4	1.688	20.4
1953	989	20.4	18.0	17.4	1.634	22.8
1952	831	14.6	17.3	14.8	1.599	22.0
1951	1,011	13.6	16.9	15.8	1.562	22.6
1950	931	12.8	19.1	14.2	1.502	21.5

STEEL MILL PRODUCTS: Net domestic shipments, plus imports, less exports, AISI.
ALUMINUM: Apparent consumption, American Bureau of Metal Statistics.
COPPER: Apparent consumption, including stockpile deliveries, if any, U. S. Bureau of Mines.
PLASTICS: Production, U. S. Tariff Commission. 1960 estimated by Society of the Plastics Industry.
CEMENT: Shipments of finished portland cement, Survey of Current Business.
RUBBER: Consumption of natural, synthetic, and reclaimed rubber, Survey of Current Business.
*1960 estimated by STEEL, except where noted.

Our Challenge from Nonmetallics

REMINGTON has introduced a gun with nylon parts. Winchester has a weapon with a barrel made of steel tubing that's reinforced with glass fibers.

Metals are getting rugged competition from many nonmetallics. All major metals except aluminum have lost ground (on a per capita consumption basis) since 1950. Most nonmetallics have gained (see table above). Not all the victories scored by plastics, cement, rubber, glass fibers, and many other nonmetallics have been at the expense of metals, but many have. Examples:

• In autos—The average 1960 car contained 20 lb of plastics vs. 11 in 1954. The total could reach 60 lb per car by the end of the 1960s, predicts William P. Gobeille, manager of plastics operations for American Motors Corp. Recent switches from metals to plastics: The Valiant's instrument housing is made of Delrin; door and window regulator handles on Ford trucks are made of plastic. Next year's Ford and Chevrolet cars will have plastic molded accelerator pedals.

• In paints and chemicals—Some plastic base paints have replaced aluminum base paints. Lead has lost

Robert C. Myers, left, director of Market Development Div., and Richard B. Lord right, director of Product Development Div., discuss U. S. Steel's plans to develop and promote the use of new steels and products with Bay E. Estes Jr., vice president-marketing

"There Must Be a Way to Use Steel . . ."

Fact gathering is the first step U. S. Steel Corp. takes to compete with other materials. Answers are found to questions like these: Is it fact or rumor that another material is being considered? If it is a fact, why is the rival being considered?

The second step is to decide on ways to solve the problem. U. S. Steel makes a value study which encompasses economics, quality, and function. The study helps reveal what approach or combination of approaches will solve the difficulty—new product, new qualities in a present product, new use for a present product, new designs to use steel better, or harder selling.

- New Product—Vinyl coated steel was developed because steel had trouble competing in some markets where finish was all important. The new product is doing well in the small appliance market. Its potential in interior paneling is big.

- New Qualities—Ferrolite, U. S. Steel's name for thin tin plate, is also the result of research. Thin tin has been technically possible for years, but its cost was prohibitive. Researchers found a way to subdue costs.

The product's big advantage: Two Ferrolite cans weigh about as much as one made of conventional tin plate.

- New Use—Stainless steel cloth can be used in parachutes; auto grilles can be made of heavy mesh; cloth, carpeting, plastics, rubber, and paper can be reinforced with wire. U. S. Steel is also concentrating on construction products (windows, doors, curtain walls, wiring systems).

- New Design—The corporation's new designs for furniture, playground equipment, and other purposes are designed to show manufacturers how stylish steel can be in their products.

- Harder Selling—A notable example here was the selling of nonbreakable, nonreturnable features of tin plate to soft drink firms. The corporation went direct to the consumer via cooperative advertising with the local distributor. Result: All big soft drink makers now package in cans.

That was a victory over glass. It illustrates the changes that have taken place at U. S. Steel. Its philosophy used to be: "Every material has its use." That has been changed to: "There must be a way steel can be used."

---

ground to plastics, for example, in linings for tanks and piping.

- In boating — A nylon propeller has taken some business from aluminum in the outboard market.

- In construction — Concrete continues to battle steel in bridge, building, and other construction.

- In tubing—Plastic pipe has displaced some steel and aluminum. Aluminum used to take the bulk of the light irrigation tubing market, but plastics have taken much of the business.

You can see the displacements all about you—pulls on furniture made of plastic instead of brass; cookware made of glass instead of metal; the bigger windows in your car—at the expense of steel.

You can easily see what the trend does to profits too. The First National City Bank of New York reports these returns of leading corporations (on net assets) in 1959:

Nonferrous producers	8.2%
Steelmakers	8.4%
Rubber product makers	12.8%
Glass manufacturers	16.7%
Cement producers	17.2%

Producers of metals are meeting the challenge from nonmetallics via new approaches to selling and sales promotion, research and product development, and the use of two or more materials in combination. Let's take a close look at each route because they profoundly affect all metalworking—the nature of its future business and profits.

The New Sell

People who use materials have no basic loyalty to any particular one. They are loyal to markets. The material that serves the market best will be bought.

"The steel industry must become expert in many new facets of selling its products," says the American Iron & Steel Institute in a warning that could apply to producers of other metals. Aluminum makers, for example, are experiencing increasing troubles with plastics. "This will involve no little change in the conduct of business. It will be necessary to contact different types of people . . . and tell them different things. The existing concept of customer service may have to be revised. Steel companies may have to consider spending considerable sums to develop new applications."

AISI lists these reasons why competitive materials are making inroads into traditional steel (and other metal) markets:

1. Technological change has spurred the development of rival materials.

2. Aggressive salesmanship by makers of the newer materials.

3. Lack of aggressiveness by makers of steel (and other metals, except aluminum).

4. The image of "new" for some of the rival materials contrasts with

"old" for steel (and other major metals, except aluminum). It's human nature to want to try the new.

5. The price situation. Polyethylene was introduced commercially in 1943, at $1 per pound. A vastly better product sold for 38 cents per pound in 1959. In contrast, there has been a general uptrend in metal prices. On a per-square-inch basis, polyethylene now costs less than tin plate.

Metal producers are beginning to sell more on a technical service basis, emulating aluminum companies that give technical and design assistance and promotional subsidies. U. S. Steel Corp. used the techniques last year when it unveiled furniture design possibilities (STEEL, Sept. 26, 1960, p. 66). It has no intention of entering the furniture business itself; it is merely showing established furniture makers what the possibilities are with steel.

For aggressiveness, metal companies will have to match the zeal of organizations like the Portland Cement Association which has more than 500 people in the field doing missionary sales and engineering work.

To create fresh images for their metals, the Copper & Brass Research Association has worked in the consumer market through its triangular labels which distinguish solid copper items from plated material. The steel industry is seeking a fresh image (versatility, beauty, stylishness) with its Steelmark symbol.

The price problem can be at least partly solved by better selling. Aluminum was sold as finish trim on Hotpoint refrigerator doors and shelves instead of plastic because the metal looks more expensive — it actually costs about the same.

U. S. Steel has high hopes for the exterior door market. A steel door costs more than its wood counterpart, but the metal unit doesn't require refitting as do the wood types, so the end cost is less.

Republic Steel Corp. has developed a knockdown door frame which can take steel or wood. It also minimizes the costly refitting problem.

New Life from R&D

AISI advises: "Look closely at how the producers of competitive materials have taken advantage of the opportunities open to them. They seize each as it is presented—or create new opportunities for their product if insufficient ideas are forthcoming from their customers. They supply extensive engineering and design service, underwrite the costs of experimental materials and processing methods, and even guarantee satisfactory product performance during trial periods. Engineering imagination is one of their selling tools . . . The producers themselves will design and manufacture new products to insure that a new market for their material is fully exploited."

To develop demand for aluminum lawn furniture, an aluminum producer entered the business. When the furniture company became a going concern, it was sold after a well defined market had been established and a sufficient number of customers of the aluminum producer had decided to enter the field on their own.

U. S. Steel, in collaboration with National Association of Home Builders and Clayton Powell, a Georgia builder, developed SteelFast, a metal channel used to fasten dry wall panels. About 500 lb of SteelFast can be used in the average new home of dry wall construction. The

"Instead of Fighting Nonmetallics, We Join Them"

William R. Butler, manager of sales development divisions, Aluminum Co. of America, sees the challenge from nonmetallics this way:

"Instead of fighting nonmetallics, we're combining them with aluminum so that we can move into markets that the metal couldn't penetrate on its own. We're taking advantage of the qualities nonmetallics have that aluminum lacks—creating new materials that combine the best features of both. Here are some examples:

- "For the construction market, we developed Alply building panels and insulated siding. The panels have an outside facing of prepainted aluminum sheets (for durability), a center of foamed polystyrene (for insulation), and an inside facing of any material that will provide adequate strength and stiffness—plywood, hardboard, plasterboard, or plastic laminates. The siding combines aluminum sheets and foamed polystyrene to make an insulated product with extra strength and rigidity.

"We're making colored indoor panels by laminating vinyl film to aluminum and outdoor panels by putting a glass (porcelain enamel) surface on aluminum sheets backed with asbestos board.

"To make wall tiles, we're dipping pieces of aluminum in fluidized plastic and baking them. We reinforce the plastic with the metal and enhance the metal's beauty by adding warmth, color, and gloss.

- "In the packaging industry, we bond aluminum foil to plastic films, paper, and boxboard. Bonding strengthens the foil and upgrades the reinforcing materials by providing a vapor barrier, a better appearance, stain resistant surface, heat reflectivity, and the ability to keep perishable goods fresh.

"Although we compete with the plastics industry for bottle cap business, we use plastic lining materials in our aluminum caps.

- "In the furniture market, we're co-operating with the woodworking and plastics industries to combat the destructive forces of some of the less formal parties in hotel rooms. Tables and desks now have wood veneer tops soaked with resin to prevent alcohol staining and backed with aluminum foil to prevent cigaret burns by taking away the heat.

- "In consumer goods, some of our customers are using vinyl coated aluminum to make luggage and typewriter cases that are easy to carry, durable, and good looking."

"Plastics Are Creating New Markets for Brass Mills..."

T. E. Veltfort, managing director of the Copper & Brass Research Association, defines copper's role this way in the battle between metals and nonmetals:

"While plastics, probably the leading nonmetallic contender, will take some of copper's markets, they also are helping make new markets for brass mill products. For example, process plants of the plastics industry require tons of heat exchanger tube and process piping made from copper and copper-base alloys.

"Moreover, plastic coatings and protective films have helped increase sales of solid copper and brass in the home furnishings field. Among the smartest decorative additions to any home are copper-enameled door hardware, wall tiles, trays, lamps, and ash trays. Costume jewelry—earrings, cuff links, necklaces—are frequently copper enameled. Porcelainized copper panels for exterior architectural use are also in vogue.

"Copper producers and brass mills are moving strongly in research to hold existing markets and develop new ones.

"A new lighter tank brass has a promising potential in the auto radiator. Another mill is marketing a tin lined copper tubing for use with gases containing corrosive sulfur compounds. Anodes of phosphorized copper used for plating Rotogravure cylinders can now be extruded to precisely curved shapes.

"Also spurring new applications for copper and its alloys is the annual copper and brass achievement competition originated three years ago by CABRA. Two prizes of $500 are awarded each year, one in architecture, the other for an industrial use. Notable entries have included a bronze curtain wall design, a revolutionary molded circuit process, several dramatically styled copper roofs, and improved windings for transformers.

"CABRA also promotes wider use of copper tubing and other brass mill products through its nationwide team of field men who work closely with major copper users, as well as with municipal code officials. Their efforts have been a substantial factor in the acceptance of copper drainage tubing DWV since its introduction in 1955."

---

potential market: About half the new homes erected each year. At the moment, one company is licensed to produce SteelFast (Bestwall Certain-Teed Corp., Ardmore, Pa.).

Metal producers are going in for basic as well as product research. The development of thin tin plate is a recent example in steel. The Steel Shipping Container Institute has launched a research project to develop a lighter steel for packaging to compete with fibers.

In Waterbury, Conn., a $1.5 million research center under construction will be devoted primarily to copper and its alloys. The new Copper Products Development Association seeks a tarnish resistant copper. Such a development will be to copper what stainless has been to steel.

New Co-operation

Much of the research is leading to new bimaterials. While dual materials are not new—tin plate is one of the older examples—their number has grown amazingly.

Plastic coated metals are now common, increasing market potentials for both materials. Republic's plastic coated pipe, for example, has saved a gas utility market from inroads by all-plastic pipe. Republic has shipped 45 million ft of the product since it was introduced two and a half years ago.

In construction, steel has long had rugged competition from concrete. Prestressed concrete is one of the most dramatic examples of "if you can't lick 'em, join 'em." The steel used in the product averages only about 0.5 per cent of the cross-sectional area. Yet, that makes for a sizable steel market because the prestressed industry grew from almost nothing in 1954 to a $100 million annual volume in 1959.

New World for Metals

Better selling, better research and development, and better bimaterials will meet the challenge of nonmetallics.

Aluminum producers, who have probably done the most aggressive job of market development among metal companies, sold 565,000 tons of their metal last year to customers who formerly used nonmetallics.

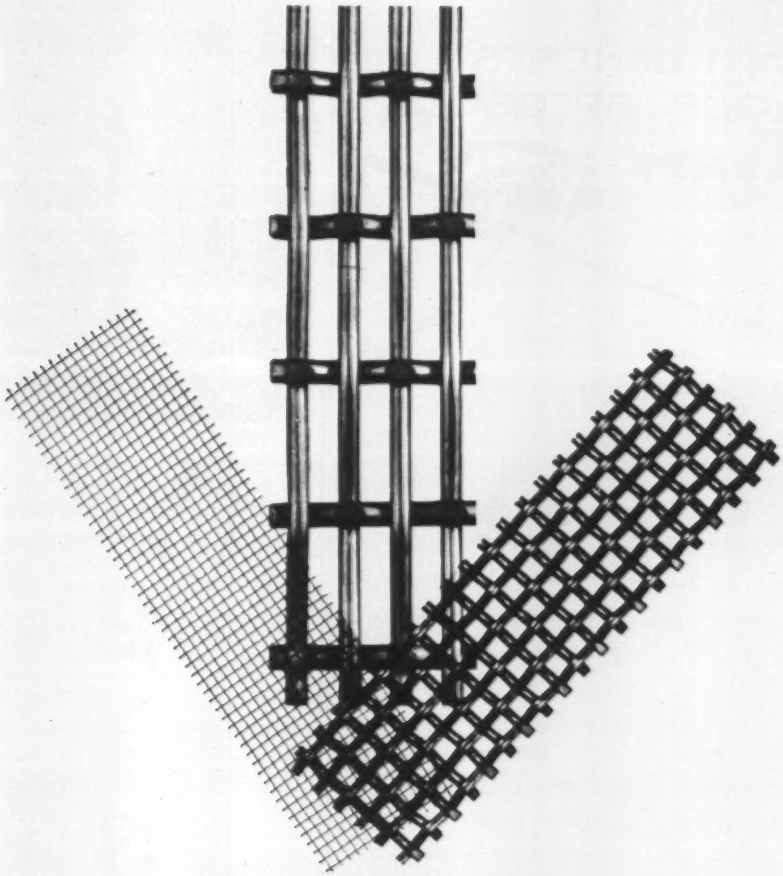
Yet will the mere resistance of nonmetallics bring maximum benefits to metalworking? The growing competition among materials is really only one manifestation of a more fundamental problem: How can metalworking best adjust to and profit from the impact of changing technology on their markets?

"We can do it," answers one steelmaker, "by changing ourselves from a tonnage industry to a dollar industry. Less tonnage of better metals will do more work. We must do this by selling our metal first and our company second. We can't long remain a successful company in an unsuccessful industry."

Plan for Profit Growth

Our Challenge in World Markets

On Mar. 13, STEEL will report on what to do about the profit decline caused by foreign competition. For a free copy of any or all articles in this series (appearing biweekly since Jan. 16), write: Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.



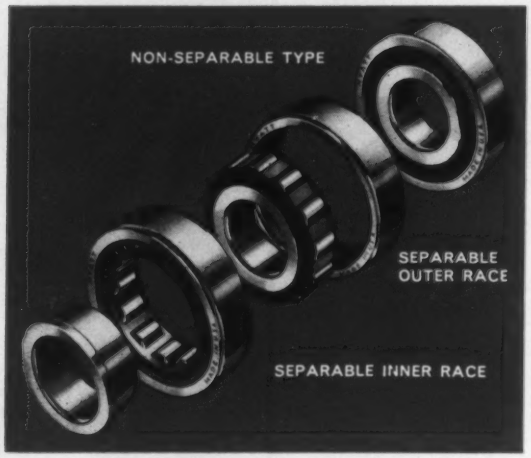
TYLER

HOW TYLER CUTS YOUR COST OF SCREENING

■ Your exact requirements matched from the world's broadest line of woven wire cloth... from the finest mesh for sifting and filtering to rugged alloy screens for heavy tonnage jobs. ■ Your time saved by fast shipments from the industry's largest inventory. ■ Proper application for best results assured by Tyler Technical Service, backed by the unique Tyler Customer Service Laboratory where screening problems can be answered by production-scale tests.

THE W. S. TYLER COMPANY
3615 Superior Ave., Cleveland 14, Ohio
OFFICES: Atlanta • Boston • Chicago • Dallas • Los Angeles • New York • Philadelphia • Pittsburgh • Salt Lake City • San Francisco • The W. S. Tyler Company of Canada, Ltd., St. Catharines, Ontario • OFFICE: Montreal

YOU GET FIVE IMPORTANT BENEFITS WHEN YOUR "SPECS" READ **HYATT**



DELIVERY

You can always depend on Hyatt to deliver on time! Hyatt delivers the goods in many other ways: Hyatt Bearings have chalked up a remarkable record for delivering long, trouble-free service . . . the kind of service that makes a sharp reduction in manufacturing costs in almost every kind of industry. *Hyatt delivers* the dependability and reliability that cuts down time. *Hyatt delivers* bearings tailored to your exact specifications and in quantities to meet your exact needs. *And, Hyatt Sales Engineers deliver* a bonus of skill and knowledge that comes from Hyatt's 68 years of specialization in cylindrical bearings. They deliver the kind of service that will help you specify the best bearings for your design requirements . . . and they follow through to be sure the bearings deliver, too. A phone call will put Hyatt to work delivering the goods for you.

2

RELIABILITY. Hyatt's Reliability Program embraces every phase of product development . . . and that starts with the highest-grade raw materials.

3

PRICE. Hyatt's advantages of quality assembly practice and uniformity of product can often reduce over-all cost.

4

ENGINEERING. Hyatt's engineering is backed by the extensive research and engineering facilities of General Motors.

5

SERVICE. Hyatt Sales Engineers are trained bearings specialists who can save you man-hours and dollars.

Replacement bearings available through United Motors System and its authorized bearing distributors

THE RECOGNIZED LEADER IN CYLINDRICAL BEARINGS

HYATT HY-ROLL BEARINGS FOR MODERN INDUSTRY

HYATT BEARINGS DIVISION, GENERAL MOTORS CORPORATION, HARRISON, N. J.

What's Ahead in Styling Trends?

Thunderbird sales are 24 per cent ahead of last year's, despite sagging industry sales and earlier criticism of the car's new look. STEEL asked George Walker, Ford's styling vice president, to spell out the T-Bird's sales appeal and how he thinks such market factors may influence his company's future styling trends

Q: Mr. Walker, when the 1961 Thunderbird was introduced, many persons criticized its styling and said they liked the crisp lines of the 1960 car better. Why is the car selling so well?

A: "I suspect that many of the critics were people for whom regular styling change holds no particular appeal. Their reason isn't necessarily economy. It may be tradition, a fondness for a particular design, or any one of countless personal feelings. On the other hand, the Thunderbird seems to be appealing more and more to the types of buyers who not only accept but demand marked differences between their cars from year to year. I also think almost any radical change in styling takes a little while to get used to.

"You'll remember that this same sort of criticism arose in 1958 when we dropped the two seated 'Bird and introduced the four passenger model. Look what happened. Sales doubled and have been climbing ever since. We've sold 26,700 1961 Thunderbirds in the first three months compared with 20,500 in the similar period a year ago."

Q: If the 1960 styling was called "crisp," how do you define the styling of the 1961 Thunderbird?

A: "Simplicity is still the key to describing the styling of all our cars, not just the Thunderbird. What we are trying to do is evolve from the crisp appearance that characterized our cars in the late 1950s into a contoured look that's sleek but not bulbous. By and large, automotive styling is a process in which a feature or group of features makes its appearance, then is improved upon year after year. I like to think our most significant postwar car was the 1949 Ford because it has provided the basic concept for our car styling since then."

Q: What feature of the 1949 Ford demonstrates the evolutionary concept?

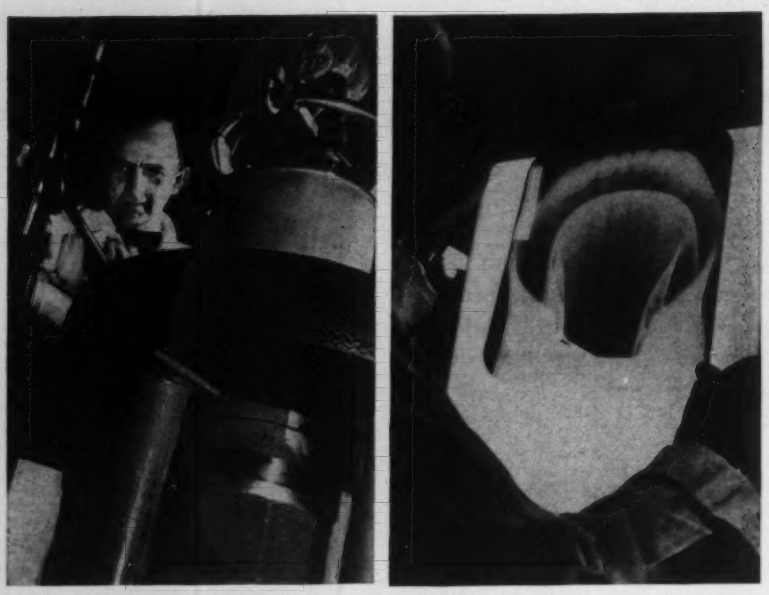
A: "Taillights are a good example. In 1949, other cars tended to bury them in the sheet metal, but we made a definite feature out of them. The tubelike panels you see at the rear of our cars today had their origin in the treatment given the '49 model. Incidentally, we are finding that the public still seems to prefer our traditional circular taillights. I must admit we've yet to find a treatment that matches this one in popularity."

Q: What styling trends do you see for the future?

A: "I imagine that we'll continue to develop our contoured look for awhile. Some people have asked me if we're going to cigar shaped cars. I honestly don't know, but I can't say that we won't some day. I am more convinced than ever before that car buyers have inherently good taste, but they can't always express themselves. I like to think that our job is to interpret how people feel about cars.

"In the future, I think more emphasis will be placed on front end styling to achieve a sense of rich-

(Material in this department is protected by copyright, and its use in any form without permission is prohibited.)



ELECTROSTATIC POWDER AIDS IN X-RAYING TIRES at Goodyear Tire & Rubber Co., Akron. Objective of x-ray (being taken at left) is to check bead wire location, spot porosity, and measure cord angles. The powder helps detail images on selenium-coated aluminum x-ray plates (right). Variations of 1 per cent in the amount of radiation absorbed by the plate can be detected

ness. We can do this with new materials, different kinds of finishes, and certainly with different contouring of sheet metal to make the whole front end sweep together into a sleek, trim appearance."

Q: Will we see different styling concepts within the same company?

A: "We aren't going to lose the family resemblance between our different cars, but we definitely will change the styling of some cars more frequently than we change others. The automobile market is no longer split into a few segments, it's becoming fragmentized. To be successful, a full line company must cater to custom tastes.

"I said before that some people don't care about annual changes, while others demand them. And they want that styling to denote different things. That seems to be another reason why the Thunderbird is so popular. It's a specialized car but offers many things to many people. It's distinguished, useful, and yet it's sporty—three qualities that seem to be hard to get in a single automobile."

Q: Do you think engineering or styling will achieve more prominence in future car designs?

A: "I don't think it's a question of which is the most prominent. Each has a specific job to do. No matter what sort of skin we put on the package we call a car, practical requirements must have top priority. But as a stylist, I'm the greatest champion of engineers in the company. They develop new and better ideas every year, giving us an opportunity to make cars more attractive every year.

"This I'm sure of—people grow weary of products that are designed solely to perform the function for which they were intended. They eventually find themselves surrounded by a starkness and sterility that become downright depressing. That's why we'll continue to make styling changes, but we'll make them within the limits of functionalism and practicality demanded by the car buyer."

Detroit Asks: Can Plastic Muffler Take Peak Heat?

An Ohio company researching high temperature exhaust systems for missiles has come up with a plastic muffler for automobiles. Will it withstand peak exhaust temperatures? motordom asks.

Curt A. Knoppel, president, Proman Inc., Akron, tells STEEL his firm has been able to modify one of the phenolic resins so it will withstand constant temperatures up to 800° F. His theory (and Detroit's) is that under normal conditions a car's exhaust system is exposed to temperatures in the 500 to 600° F range, but for short periods, runaway temperatures may climb as high as 1300° F. Mr. Knoppel claims his muffler will withstand 1100° F temperatures for 5 seconds, and 1300° F for 1 second or less.

Manufacturers of metal mufflers frankly are dubious. One of the leading suppliers tells STEEL that its temperature studies show that under peak loads (climbing a hill with a trailer), exhaust temperatures may hold at 1200 to 1300° F for well over 5 minutes.

But it's possible the plastic can be further modified to become more temperature resistant.

The plastic muffler is compression molded in two halves under pressure of 2500 to 4500 psi. Instead of internal baffles surrounded by a shell, it's designed as a series of eight resonance chambers. It weighs less than 2.5 lb compared with 11 to 13 lb for steel mufflers.

U. S. Auto Output

Passenger Only	1961	1960
January	414,498	688,731
February		659,323
March		654,242
April		582,909
May		611,226
June		613,147
July		434,377
August		305,527
September		407,685
October		617,816
November		597,132
December		522,239
Total		6,694,354

Week Ended	1961	1960
Jan. 21	94,155	175,060
Jan. 28	96,057	173,231
Feb. 4	100,589	164,027
Feb. 11	88,006	153,186
Feb. 18	75,531†	158,898
Feb. 25	95,000*	153,501

Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.

NICKELOID IS EVERYWHERE

IN THE LIVING ROOM

IN THE KITCHEN

ALL AROUND THE HOUSE

These eye-catching products use functionally a basic Nickeloid Metal. The finish of Chromium, Nickel, Brass or Copper is electroplated to a base metal, usually Steel (but often Zinc, Brass or Copper).

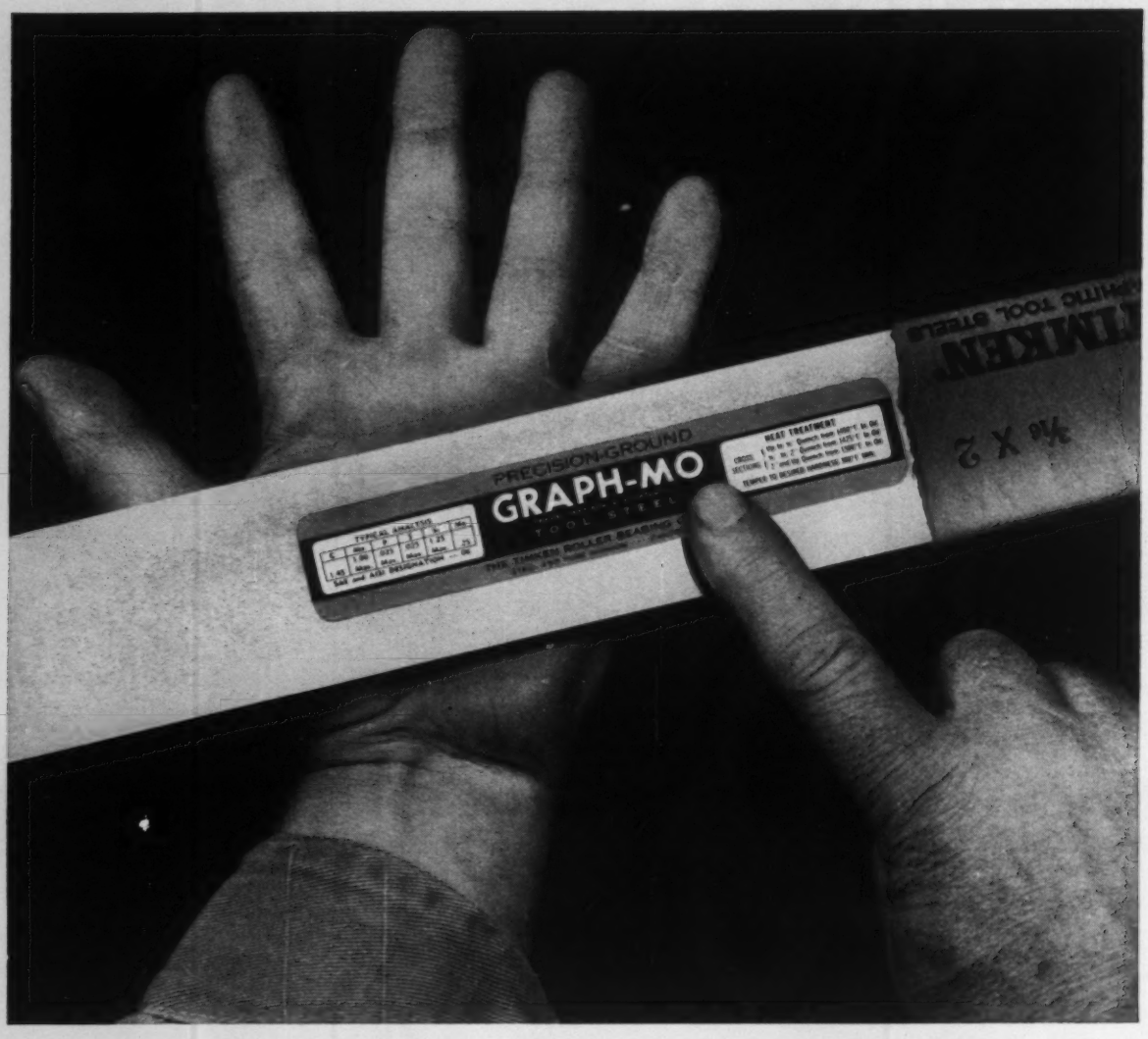
Mostly, Nickeloid Metals are supplied in continuous coils in widths up to 24" for modern, low cost fabrication. They're also available in sheets and strips. Optional: bright or satin finishes, plating one or both sides, a galaxy of stunning patterns and crimps.

Quality plating produces metals so durable they can be fabricated, even quite severely drawn or bent. Rejects minimized. For severe stamping, we offer Mar-Not protective coating that is easily peeled off after its job is done.

Yes, wherever you go or whatever you do, there is an abundance of useful and prized products on which a Nickeloid Metal gleams, front and center, in full spotlight. Their use at once captures a smart, modern beauty that is durable, easy to keep looking new, and chic. But here is beauty that is more than skin deep . . . Nickeloid Metals are versatile, extremely economical in manufacture . . . deep-down in quality all the way. They are the shopkeeper's delight, the manufacturer's friend, and the designer's inspiration. You can *do so much* with Nickeloid! It's more than a Metal . . . it's a *Method!* Write for free Introductory Kit, including metal samples. Or, phone one of our sales offices (located in most principal cities).

AMERICAN NICKELOID COMPANY · PERU 1, ILLINOIS

America's Pioneer Manufacturer of Pre-Finished Metals — Since 1898



5 big tool steel savings in one package

Wrapped and ready to use, precision ground flats of Graph-Mo® steel save 5 ways in making gages, dies and other tool steel parts. It's because . . .

1) **They're precision ground to size,** decarb free, ready for marking and cutting. You save costly stock removal.

2) **There's a 30% easier machining** with Graph-Mo than with conventional tool steels.

3) **Heat-treating response of Graph-Mo is uniform,** eliminates distortion in preparation.

4) **Graph-Mo outwears ordinary tool steels 3 to 1** because of the free graphite and diamond hard carbide in its structure.

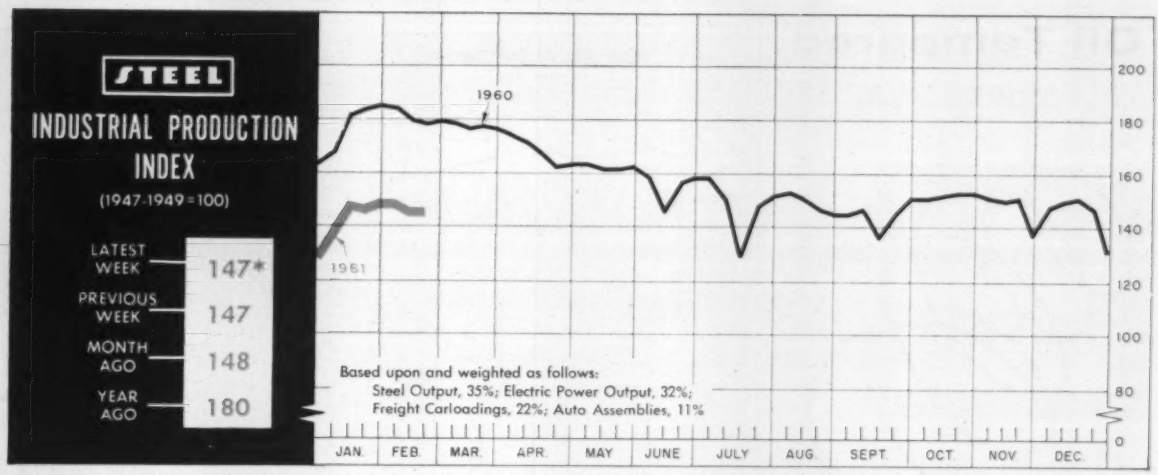
5) **Special wrapping protects** Graph-Mo precision ground flats, assures top condition when you're ready to use them.

Graph-Mo is the only tool steel that combines the advantages of machinability, wearability and stability. More than 250 standard stock sizes of precision ground flats make possible maximum savings on many applications. And—there's only one Graph-Mo, and the Timken Company makes it. For stock list, call your local Timken steel distributor or write: The Timken Roller Bearing Company, Steel and Tube Div., Canton 6, Ohio. Cable: "TIMROSCO".

Makers of Tapered Roller Bearings, Fine Alloy Steel and Removable Rock Bits.

TIMKEN®
Fine Alloy **STEEL**

TIMKEN GRAPHITIC STEELS ARE AVAILABLE FROM STEEL SERVICE CENTERS IN 44 CITIES IN THE UNITED STATES AND CANADA



*Week ended Feb. 18.

STEEL's Index Bucks Historical Trend

THE COURSE of STEEL's industrial production index thus far in 1961 won't give rise to revelry in the streets, but it should encourage some positive thinking about the prospects for 1961 as a fairly sound business year.

In the last seven years, STEEL's index has shown a gradual decline in the first quarter. Exceptions: 1955, when we were zooming into a boom year; and 1959, when we were feverishly preparing for the long steel strike. Otherwise, the index registered a slow but consistent decline between the high point in January after the holidays and the end of March.

• **Pattern Shifts**—This year, the pattern differs from the rule and the exceptions. The index was at 149 in the second week of January, slipped to 148 at mid-month, then marked a slight recovery to 150 at the end of the month, where it remained until it fell to 147 last week. Instead of continuing the decline this week, it firmed at 147 for the second consecutive week, only 3 points below the January peak which held into the first week of February.

The STEEL index is based on weighted values given to steel ingot rate, auto production, electrical output, and freight carloadings. Although it must be recognized that the cold weather kept electrical output at a high rate, compensating for the low level of auto production and a slow pace in freight carloadings, the steadiness of STEEL's indicator suggests that business, relatively speaking, remained fairly stable in a month which is historically in a down cycle.

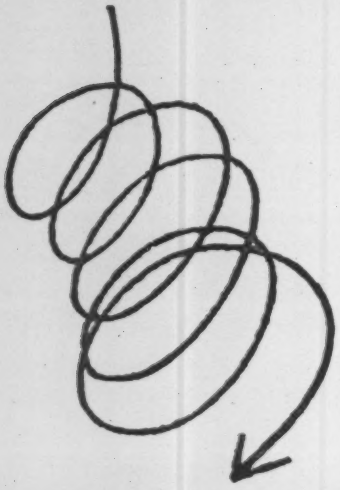
• **Solid Spring Upturn?**—Business will probably exhibit the usual seasonal upturn in the spring. The coming of pleasant weather will lure many prospective buyers out of hibernation. And the relative stability demonstrated so far this year could give the economy enough impetus to go into the spring up-

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)	1,590[1]	1,582	2,690
Electric Power Distributed (million kw-hr)	14,700[1]	14,744	14,226
Bituminous Coal Output (1000 tons)	7,350[1]	7,430	8,290
Crude Oil Production (daily avg—1000 bbl)	7,150[1]	7,174	7,123
Construction Volume (*ENR*—millions)	$329.1	$286.9	$342.2
Auto, Truck Output—U. S., Canada (*Ward's*)	104,645[1]	117,694	200,093
TRADE			
Freight Carloadings (1000 cars)	495[1]	486	572
Intercity Truck Tonnage (changes from year ago)	−7.3%	−8.8%	+3.1%
Business Failures (Dun & Bradstreet)	376	368	317
Currency in Circulation (millions)[2]	$31,930	$31,805	$31,631
Dept. Store Sales (changes from year ago)[2]	−3%	−5%	+4%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$24,348	$27,119	$25,402
Federal Gross Debt (billions)	$290.3	$290.2	$290.5
Bond Volume, NYSE (millions)	$33.5	$35.4	$30.7
Stocks Sales, NYSE (thousands of shares)	23,022	23,272	17,290
Loans & Investments (billions, adjusted)[3]	$108.6	$109.7	$101.7
U. S. Govt. Obligations Held (billions)[3]	$30.3	$30.7	$26.1
PRICES			
STEEL's Finished Steel Price Index[4]	247.82	247.82	247.82
STEEL's Nonferrous Metal Price Index[5]	211.8	211.6	234.8
All Commodities[6]	120.0	120.0	119.2
Commodities Other than Farm & Foods[6]	128.2	128.1	128.6

*Dates on request. [1]Preliminary. [2]Federal Reserve Board. [3]Member Banks, Federal Reserve System. [4]1935-39=100. [5]1936-39=100. [6]Bureau of Labor Statistics Index, 1947-49=100.

NEWCO
Oil Tempered



SPRING WIRE

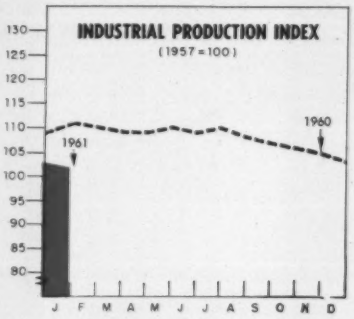
is
available
in all grades
and is
consistently
uniform
from coil
to coil.

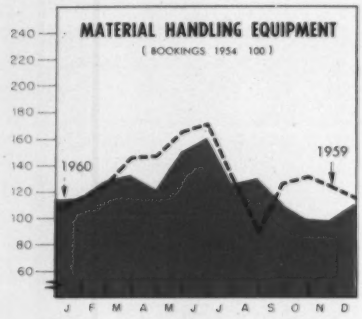
NEW ENGLAND
HIGH CARBON WIRE CORP.

MILLBURY, MASSACHUSETTS

Offices and warehouses: Cleveland
Detroit
Los Angeles
Melrose Park (Chicago)
and Millbury

THE BUSINESS TREND





(Seasonally adjusted)

	Total Production		Total Mfg.		Durables Mfg.	
	1961	1960	1961	1960	1961	1960
Jan.	102	111	101	112	95	111
Feb.	...	110	...	110	...	109
Mar.	...	109	...	110	...	108
Apr.	...	109	...	109	...	106
May	...	110	...	110	...	107
June	...	109	...	110	...	105
July	...	110	...	110	...	106
Aug.	...	108	...	108	...	104
Sept.	...	107	...	107	...	102
Oct.	...	106	...	106	...	101
Nov.	...	105	...	104	...	98
Dec.	...	103	...	103	...	96
Avg	...		...		...	

Federal Reserve Board. *Preliminary.

	1960	1959	1958	1957
Jan.	114.96	115.84	93.07	126.34
Feb.	128.74	124.77	93.49	139.29
Mar.	133.60	146.36	97.89	140.78
Apr.	122.41	147.28	122.36	132.67
May	150.33	164.45	118.04	157.95
June	160.23	170.72	131.15	121.57
July	126.79	130.26	134.34	128.31
Aug.	131.33	87.02	104.46	110.09
Sept.	111.11	126.43	85.41	116.79
Oct.	99.89	131.09	111.35	124.80
Nov.	98.96	124.16	110.88	87.80
Dec.	110.00	113.78	105.97	105.65
Avg	122.55	131.85	109.87	124.34

Material Handling Institute Inc.

Charts copyright, 1961, STEEL.

turn on a sound basis. (For more on the business outlook, see Page 67.)

The patterns of the Federal Reserve Board Index (see table and graph, above) and the STEEL index have coincided rather closely over the years. This suggests that the FRB index will remain fairly stable too, possibly falling no more than a point in February.

How About '61, '62 Profits?

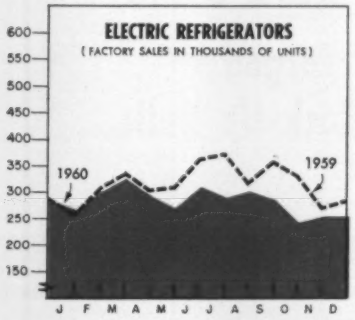
A preliminary estimate of pretax profits in 1960 suggests a total of $43.75 billion. A record $47 billion was chalked up last year. But what about 1961 and 1962?

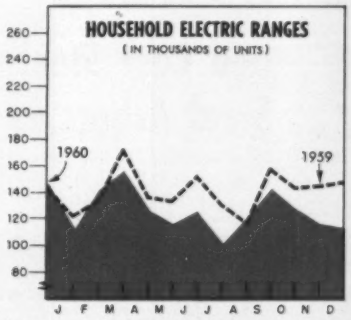
"Projections indicate that a reasonable guess on pretax corporate profits would be $40 billion for this year, with a level approaching or attaining a record $50 billion next year," says James M. Dawson, vice president and economist, National City Bank of Cleveland. Here's Mr. Dawson's reasoning:

● **Look at the Record** — If profits repeat the pattern of the 1949, 1954, and 1958 recessions, the current quarter could be the trough. Profits would total $37.5 billion this year and about $50 billion next year. However, if the current recession continues to be milder than other postwar setbacks, the drop in profits would presumably be less severe. Perhaps $40 billion is a reasonable estimate for 1961.

Another interesting approach is to note that in recession years '49, '54, and '58, pretax profits were $26.5 billion, $34 billion, and $37.75 billion. A trend line fitted to those figures suggests that $40 billion is a logical figure for the current recession year. Similarly, profits in postrecession years 1950, 1955, and 1959 were $40.5 billion, $45 billion, and $47 billion. Here the trend line points to $48.5 billion for next year.

● **Inventory Factor** — There is a striking correlation between profits and inventory policy. Roughly speaking, a change of $1 billion in the annual rate of inventory accumulation or liquidation has been accompanied by a $1 billion increase or decrease in profits. The charting of inventories implies that liquidation of say $2 billion this year and accumulation of perhaps $5 billion next year might mean profits of $40 billion this year and $48 billion in 1962.





	1960	1959	1958
Jan. ..	266.700	256.200	206.100
Feb. ..	302.400	306.200	227.800
Mar. ..	338.100	333.700	261.100
Apr. ..	294.000	301.000	210.800
May ..	268.000	308.200	262.900
June ..	308.500	361.000	316.300
July ..	291.500	370.800	279.700
Aug. ..	301.400	314.100	245.900
Sept. ..	284.900	355.700	295.200
Oct. ..	244.200	329.600	277.500
Nov. ..	253.300	265.900	245.500
Dec. ..	253.000	282.600	286.900
Totals .	3,406,000	3,785,000	3,116,700

National Electrical Mfrs. Assn.

Total Factory Sales—Units

	1960	1959	1958
Jan. ..	115.000	120.800	109.000
Feb. ..	143.200	134.600	108.700
Mar. ..	156.400	172.600	117.900
Apr. ..	127.000	136.100	95.600
May ..	117.600	133.400	96.000
June ..	126.200	151.400	116.800
July ..	102.100	129.200	98.500
Aug. ..	122.400	116.600	81.400
Sept. ..	142.800	157.200	122.300
Oct. ..	127.900	143.400	135.100
Nov. ..	118.400	144.000	129.100
Dec. ..	113.500	147.500	144.000
Totals .	1,512,500	1,686,800	1,354,400

National Electrical Mfrs. Assn.

"These calculations all assume that the timing of the current recession will be similar to other postwar setbacks with the magnitude of this adjustment, if anything, somewhat milder," comments Mr. Dawson. He concludes: "The odds thus far favor such an assumption."

GNP Sets Record in 1960

Gross national product reached a record $503 billion last year, reports the Department of Commerce. That's an increase of $21 billion over the $482 billion performance in 1959.

Output surpassed the 1959 high by 4.5 per cent in value and nearly 3 per cent in physical volume. The flow of income and purchasing power rose correspondingly.

• **Personal Income Up**—Personal income for the year exceeded $400 billion for the first time. It increased throughout most of 1960, and despite the yearend decline, the January, 1961, rate of $406.33 billion topped that of a year earlier by $10.5 billion, or 2.5 per cent. National income also reached a new high for the year. Most of the increase in each instance represented a gain in real purchasing power.

Final demand (all GNP except inventories) advanced from quarter to quarter throughout 1960, rising from an annual rate of $482 billion in the final quarter of 1959 to more than $506 billion in the final quarter of 1960. Continuing increases in consumer and government purchases and in exports more than offset some weakening in fixed investments after midyear.

• **Inventories Down**—As an aftermath of the steel strike, inventory accumulation reached a rate of $11 billion in the first quarter of 1960. But demand gradually diminished, and in the final quatrer, there was a drop of $3 billion in business inventory holdings.

Reflecting the fluctuations in inventory policy, GNP fell back a little after midyear from the peak $505 billion annual rate of last spring and held at $503.5 billion in the third and fourth quarters. The decline was more pronounced in manufacturing production and related lines, which were most directly affected by the reduction in industrial buying. Activity continued high in most other industries.

HOW TO SAVE MONEY BY RIVETING

I **Design** for rivets. Use their adaptability not only for assembly, but for electrical contacts, pivots, inserts in molded materials, fastening a number of parts in one operation, joining metallic and nonmetallic parts together, or to each other.

II Plan on **high speed assembly.** Riveting is a high speed operation, and even manually operated machines include automatic hoppers. The uniform quality and strength of Milford semi-tubular, tubular, split or compression rivets permits the use of high speed production equipment by unskilled operators.

III Count on a **positive** joint. A riveted joint can be visually inspected, an advantage not to be overlooked when compared to many other methods of fastening.

IV **Use** Milford's "five plant" facilities. Each Milford plant is strategically located to serve the important industrial areas of the U.S. **Order** and **get** Milford Products **when** and **where** you need them.

Have **uninterrupted production** with Milford rivet-setting machines. Used singly, or in economical "multiples", where you set more than one rivet with no increase in labor or handling costs, Milford riveters, setting Milford rivets, are the surest way to lowest in-place assembly cost.

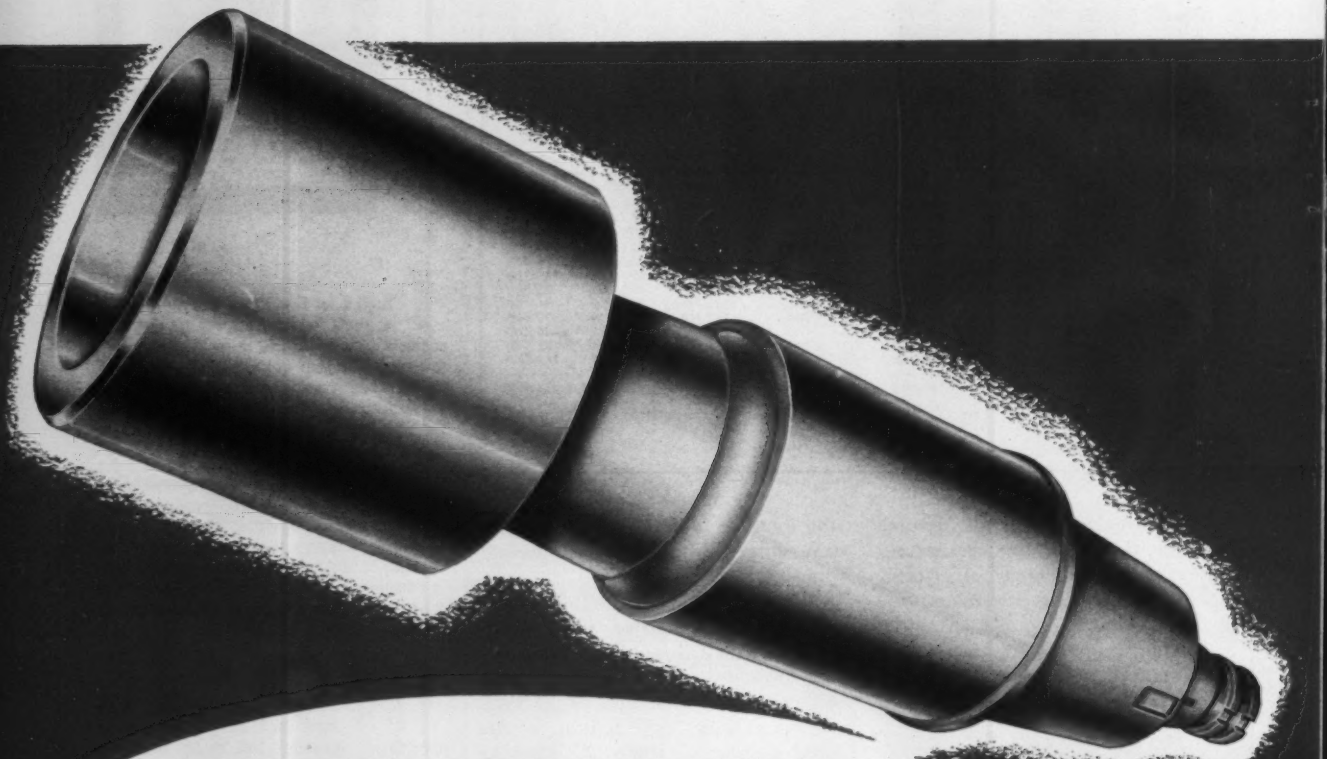
THE MILFORD RIVET MILFORD RIVET & MACHINE CO.

MILFORD, CONNECTICUT • HATBORO, PENNA.
ELYRIA, OHIO • AURORA, ILL. • NORWALK, CALIF.

Ohio

FORGED SLEEVES

and Cast Steel or Forged Steel Arbors for Back-Up Rolls



A Complete Back-Up Roll Service

Ohio Steel, manufacturers of all types of iron, steel and forged steel rolls, announces a new complete back-up roll service.
Operations Now Include:

• Alloy Cast Steel Back-up Rolls and Arbors. • Forged Steel Back-up Rolls and Arbors from vacuum poured, degassed steel. • Custom forged Back-up Roll Sleeves from vacuum poured, degassed steel applied to new or used cast steel or forged steel arbors. • Machine down and resleeve previously sleeved back-up rolls.

If you're looking for a complete back-up roll service that'll meet your most exacting specifications, contact your nearest Ohio roll sales engineer.

THE OHIO STEEL FOUNDRY COMPANY
LIMA, OHIO

OHIO IRON and STEEL ROLLS

Carbon Steel Rolls	Flintuff Rolls	Denso Iron Rolls
Ohioloy Rolls	Double-Pour Rolls	Nickel Grain Rolls
Ohioloy "K" Rolls	Chilled Iron Rolls	Special Iron Rolls
Nioloy Rolls	Forged Steel Rolls	

PLANTS AT LIMA AND SPRINGFIELD, OHIO. *. .Virtually at the center of the Steel Industry*

OR-46

KENNETH F. WILLIAMSON
Grove Valve v. p.

ROBERT T. KIEFER
Volco Brass gen. sales mgr.

G. ROBERT COMPTON JR.
McKiernan-Terry exec. v. p.

DONALD A. SOMMER
Keystone Steel gen. sales mgr.

Kenneth F. Williamson was named vice president and product manager-valves for **Grove Valve & Regulator Co.**, Oakland, Calif., subsidiary of Walworth Co. He was assistant sales manager.

Robert T. Kiefer was made general sales manager, **Volco Brass & Copper Co.**, Kenilworth, N. J. He replaces the late **Walter Drayton**. Mr. Kiefer was New England regional sales manager.

Gen. Phillips W. Smith, president of Jack & Heintz, Cleveland, division of **Siegler Corp.**, Los Angeles, was named a vice president of Siegler. Jack & Heintz recently merged with Siegler.

Leo Reierstad was made general sales manager of **Permanent Mold Die Co. Inc.**, Hazel Park, Mich., and for subsidiary companies: Piston Mold Die Co. and PMD Extrusion Die Co. He was export sales manager for Aluminium Ltd. Sales Inc.

G. Robert Compton Jr. was made executive vice president and chief administrative officer, **McKiernan-Terry Corp.**, Harrison, N. J. He was vice president in charge of the Pile Hammer Div. New vice presidents are: **Howard L. Mattes,** engineering; **Vincent F. Severo,** contracts administration; **Byron Nierenberg,** marketing; **Frank H. Keckeissen,** purchasing. **Frank W. Hamilton** (vice president) is responsible for manufacturing.

S. R. Zimmerman Jr. was elected executive vice president, **Raybestos-Manhattan Inc.**, Passaic, N. J.

Edward C. Bayer was made technical director of **Holcroft & Co.**, Detroit. He joined the company as a metallurgist in 1946.

Harry Zimmerman was named sales manager, RD Instruments, **Hickok Electrical Instrument Co.**, Cleveland. He was district sales representative for Westinghouse Electric Corp.

Donald A. Sommer was made general sales manager, **Keystone Steel & Wire Co.**, Peoria, Ill. He was assistant manager, Industrial Sales Div.

D. R. MacNaughton was appointed vice president-marketing, **Performance Measurements Co.**, Detroit. He was national product sales manager, Noncontact Gaging Dept., for Weston Instruments Div., Daystrom Inc.

John D. Goodell was appointed president and general manager, **USI Robodyne Div.**, Silver Spring, Md., U. S. Industries Inc. He was director of engineering at Robodyne.

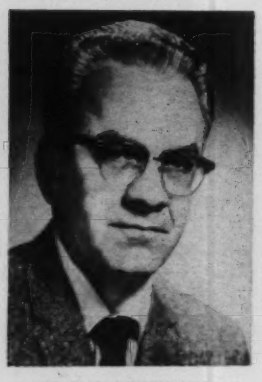
Harold W. Baque was named vice president and assistant to the president, **Corhart Refractories Co.**, Louisville, subsidiary of Corning Glass Works. **John K. Meyer** was made vice president and general sales manager; **Edward E. Humphrey** field sales manager; **Benjamin P. Colosky** staff sales manager;

LEO REIERSTAD
Permanent Mold Die sales

EDWARD C. BAYER
Holcroft technical dir.

HARRY ZIMMERMAN
Hickok RD sales mgr.

HAROLD W. BAQUE
Corhart Refractories exec.



LELAND HARGRAVES

FRED W. DISCHINGER

Arwood Corp. plant managers

RUSSELL C. FLOOD

FREDERIK R. STARR

Schrader-Scovill International appointments

John M. Rauscher manager of technical services.

Arwood Corp. appointed **Leland Hargraves** manager of its Los Angeles plant; **Fred W. Dischinger** manager of its LaVerne, Calif., plant. Mr. Hargraves was production manager of the Los Angeles plant. Mr. Dischinger was the company's Midwest regional sales manager, Cleveland.

William L. Palmer was named assistant superintendent of Republic Steel Corp.'s **Union Drawn Steel Div.** plant in Massillon, Ohio. He is replaced as division industrial engineer by **T. E. Kirch Jr.**

Edwin Shuttleworth III, assistant vice president, **Driver-Harris Co.,** Harrison, N. J., was made assistant sales manager.

Hawkridge Bros. Co., Boston, named **Harold R. Evans** senior vice president; **Leland S. Evans** vice president-marketing; **W. E. Nelson** vice president-aluminum sales.

Administrative appointments have been made by Scovill Mfg. Co. Inc. for its newly formed **Schrader-Scovill International Div.,** Brooklyn, N. Y. **Russell C. Flood** was named general manager; **Frederik R. Starr,** administrative manager; and **Frank Fernadez,** technical manager.

Roy C. Brewer was named sales manager-commercial products for **Pesco Products Div.,** Bedford, Ohio, Borg-Warner Corp. **Donald C. Tabb** was made manager, planning and sales administration.

Donald G. Hazlett, assistant plant manager, was made plant manager of **Vulcan Mold & Iron Co.'s** Latrobe, Pa., operation.

Sharon Steel Corp., Sharon, Pa., promoted four to new sales positions: **James W. Byrne** was made manager of marketing hot rolled products; **Rollin E. Douglas,** manager of marketing special coated steels; **Walter A. Garrett,** manager of marketing of Brainard Strapping; and **Donald W. Meyer,** manager of marketing for cold finished and coated products.

Dr. James E. Parks was made director of marketing research and manpower development of **Westinghouse Air Brake Co.,** Pittsburgh.

E. W. Ervasti fills the new post of assistant director-marketing, **Wolverine Tube Div.,** Allen Park, Mich., **Calumet & Hecla Inc.**

Thomas L. Mayes Jr. was made manager of original equipment manufacturers sales at **General Electric Co.'s** General Purpose Control Dept., Bloomington, Ill. **E. S. Reeser Jr.** was made Pittsburgh district manager for steel sales.

Raymond G. Sloan Jr. succeeds **William Jones** as manager of magnetic steel products at **Armco Div.,** Middletown, Ohio, Armco Steel Corp.

Norman M. Sted was made assistant general sales manager, General Sales Dept., **American Steel & Wire**

JAMES W. BYRNE

ROLLIN E. DOUGLAS

WALTER A. GARRETT

DONALD W. MEYER

Sharon Steel promotions to new sales positions

When you require complex parts...

Specify Precision Forgings by WILLIAMS

The forging illustrated is one half of a housing for an aircraft weapons system furnished to the Springfield Armory. Its precision manufacture, from design to finished forging, is typical of all Williams' forgings, large and small.

1. Overall design improved by Williams to include forged lugs and bosses which were formerly attached by welding.

2. Starting with a 5" square billet of 4340 steel weighing 51 lbs. this forging required extreme displacement of metal to form its half round shape with such a wide range of complex thick to thin sections. Finished weight, 30 lbs.

3. The ingenuity of our die designers made possible the intricate dies required for trimming and "punch-out" that would conform to the varying planes and sectional thicknesses.

4. Forgings were normalized and heat-treated to a Brinell hardness of 255-302.

5. Comprehensive inspection of finished forgings complied with rigid ordnance inspection requirements.

If its forgeable... from carbon, alloy or stainless steel, monel, brass, bronze, copper, aluminum alloys or titanium...
GET A QUOTE FROM WILLIAMS

W

Send for new 28 page Forging Design Manual No. 60

Includes all necessary design data—tolerance tables, standard practices, specifications, etc. No cost...no obligation.

J. H. WILLIAMS & CO.
DIVISION OF UNITED-GREENFIELD CORPORATION
406 Vulcan Street, Buffalo 7, N. Y.

Please send your new Forging Design Manual No. 60

NAME_____ TITLE_____
FIRM_____
STREET_____
CITY_____ ZONE_____ STATE_____

MARION S. RICHARDSON
GE-Industrial Heating Dept.

PAUL F. ALLMENDINGER
Alemite-Instrument Div. post

E. H. DAMON
Strategic Materials v. p.

WILLIAM W. SMITH
ESBCO battery div. post

WILLIAM H. JOHNSON
Shenango Furnace div. post

JEROME GRAHAM
Weirton commercial research mgr

RICHARD B. FLYNN
National Copper & Smelting sales

LENVIK YLVISAKER
Continental Can v. p.

RICHARD H. LEWIN
Cerro Sales president

Marion S. Richardson was named to the new post of sales manager, industrial furnaces, at **General Electric Co.'s** Industrial Heating Dept., Shelbyville, Ind. He was with Hevi-Duty Furnace Co., Philadelphia.

Paul F. Allmendinger was appointed manager of engineering, **Alemite & Instrument Div.**, Chicago, Stewart-Warner Corp. He was chief engineer for automotive, marine, industrial, and other instrument products.

E. H. Damon was elected vice president for administration, **Strategic Materials Corp.**, New York. He was treasurer. **W. H. Dalman** was made assistant treasurer.

William W. Smith was named manager of engineering and development for **Electric Storage Battery Co.'s** Nickel-Alkaline Battery Div., West Orange, N. J. He succeeds **J. Donald Moulton**, retired. Mr. Smith was manager-alkaline battery development in the Engineering Dept. of ESB's Exide Industrial Div., Philadelphia.

William H. Johnson was named technical director, **Centrifugal Casting Div.**, Dover, Ohio, Shenango Furnace Co. He formerly was senior metallurgist, Process Metallurgy Div., Battelle Memorial Institute.

Jerome Graham was made manager, Commercial Research Dept., **Weirton Steel Co.**, Weirton, W. Va., division of National Steel Corp. He was with Great Lakes Steel Corp., National Steel's Detroit division. **Irwin D. Carson** was made manager, Product & Market Development Dept.

Richard L. McDermott was made manager of industrial sales at the Norwood, Ohio, Works of **Allis-Chalmers Mfg. Co.**

Div., Cleveland, U. S. Steel Corp.

Richard B. Flynn was appointed sales manager, **National Copper & Smelting Co.**, Cleveland. He was with Wolverine Tube Div., Calumet & Hecla Inc.

Calbraith P. Champlin Jr. was elected president of **Strong Steel Foundry Co.**, Buffalo.

Lenvik Ylvisaker was elected vice president of research and engineering at **Continental Can Co.**, New York.

Richard H. Lewin, vice president of Cerro Corp., New York, was elected president of its subsidiary, **Cerro Sales Corp.** He succeeds **A. Russell Merz**, who resigned for health reasons.

OBITUARIES...

Charles T. Evans Jr., 43, vice president, technical director, **Universal-Cyclops Steel Corp.**, Bridgeville, Pa., died Feb. 8.

Marshall D. King, 54, foundry superintendent, **Hills-McCanna Co.**, Lincolnwood, Ill., died Feb. 9.

your product's reputation and sales... can go down hill fast

...if nuts keep coming loose

Suppose you were your own customer, and bought the product *you* make. You'd expect it to stand up to the job, whether it was a racing cart, a heavy-duty crawler, or a crusher. You'd want it to endure the bumps and thumps and constant vibration of rugged use without coming unstuck at the bolts. If a nut came loose and made you lose time or production, you'd certainly think twice about buying that product again.

This is precisely why so many of America's leading manufacturers have guaranteed the reliability of critical bolted connections on their products with Elastic Stop® nuts.

They know that a product's reputation for dependability is built in the field and they know that reorders are written in customers' maintenance records. They've verified through field experience that in the long run Elastic Stop nuts pay their own way because the exclusive nylon locking inserts keep them from working loose . . . even under the most punishing conditions of shock, impact or vibration! Elastic Stop nuts are the equivalent of "free" insurance against fastener failure for *their* product!

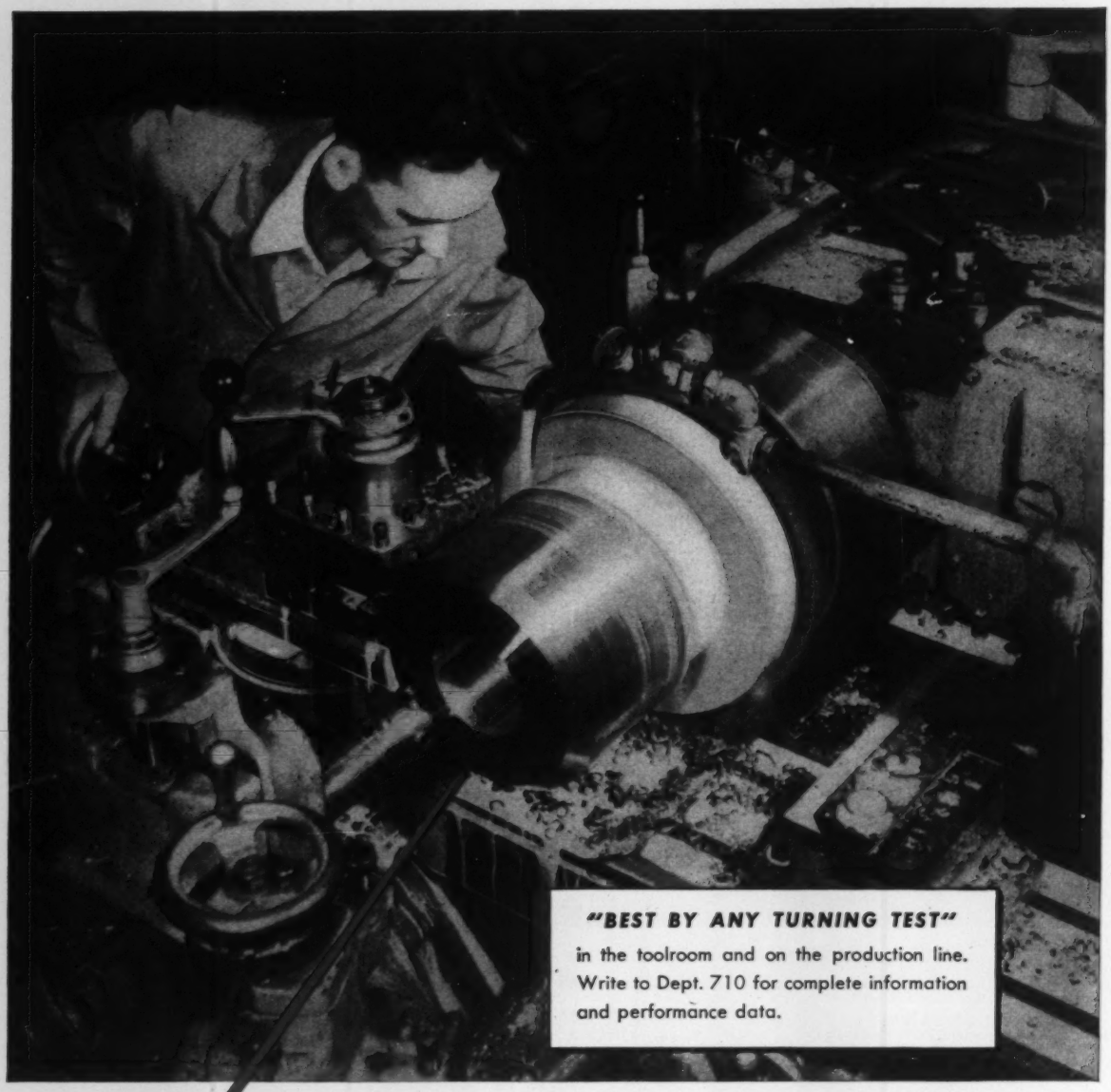
Whether your product sells for three dollars or for thousands, we think you'll be interested in a copy of the hex nut catalog No. 706. It details the regular, thin, heavy and light hex types in USS and SAE thread series and various materials and finishes; plus many dimensional "specials".

ESNA's complete line may change many of *your* "special" requirements into standard parts. Write Dept. S52-260, Elastic Stop Nut Corporation of America, 2330 Vauxhall Road, Union, New Jersey.

ESNA®

for the ring **O** *of reliability*

ELASTIC STOP NUT CORPORATION OF AMERICA



"BEST BY ANY TURNING TEST"
in the toolroom and on the production line. Write to Dept. 710 for complete information and performance data.

Jones & Lamson turret lathes are BUILT and
POWERED TO PRODUCE

MORE CHIPS **per tool**
MORE PIECES **per hour**
MORE PROFIT **per job . . . than any turret lathe of comparable size!**

JONES & LAMSON

the man who needs a new machine tool is already paying for it

JONES & LAMSON MACHINE COMPANY, 517 Clinton St., Springfield, Vt., U.S.A. J&L MACHINE TOOL DIV.

Vacuum Stream, Degassing Unit Installed by Sharon

SHARON STEEL CORP., Sharon, Pa., is constructing a vacuum stream, droplet, degassing unit which will provide high quality forging steel in a wide range of sizes and grades. It's scheduled for operation within six months, says John A. Roemer, chairman and chief executive officer.

Earlier in the year, the company started up a $1 million bright annealing plant for the finishing of stainless steel (STEEL, Jan. 30, p.93). Steel produced by this process is required for automotive, appliance, and other applications.

The vacuum degassing process is a metallurgical step beyond the usual method of producing forging quality steel. It removes hydrogen and other gases during the pouring stage and produces a steel with improved physical properties.

"The process will enable Sharon to produce forging quality steel not subject to flaking," says Mr. Roemer. "Our customers will benefit by lower manufacturing costs resulting from fewer pieces rejected after forging. We believe the process will open up new avenues in metallurgical research."

Plans for the unit call for a 75 ft extension to the electric furnace building at the Roemer Works, Farrell, Pa. It will be located at the pouring aisle level, which is 25 ft below the melt floor.

Antice Buys Foundry

Antice Co. Inc., Rochester, N. Y., purchased the good will, equipment, and certain other assets of Hetzler Foundries Inc. in Rochester. Production of bronze, aluminum, and iron castings will be performed at the Antice plant at 111 Humboldt St.

Computer Plant Enlarged

Radio Corp. of America, New York, has doubled the manufacturing and testing space at its facilities in the Natick (Mass.) Industrial Center. An additional 10,000 sq ft of space has been acquired. Roy S. Fine supervises production for the Industrial Computer Systems Dept. at Natick.

Japanese Firm Licensed

Babcock & Wilcox Co., New York, has signed an agreement with Isolite Insulating Products Co. Ltd., Osaka, Japan, which permits the Japanese firm to manufacture and sell B&W's line of refractories. Babcock & Wilcox will aid in the startup of manufacturing operations at Isolite's new, 215,000 sq ft plant in Toyokawa, Japan.

Unites Electronic Units

General Dynamics Corp., New York, established a new division, General Dynamics/Electronics. The division will absorb the former Stromberg-Carlson Div. plus those electronic products of other divisions which can be marketed as separate entities. James D. McLean is president of General Dynamics/Electronics; G. J. Dickey, vice president and general manager.

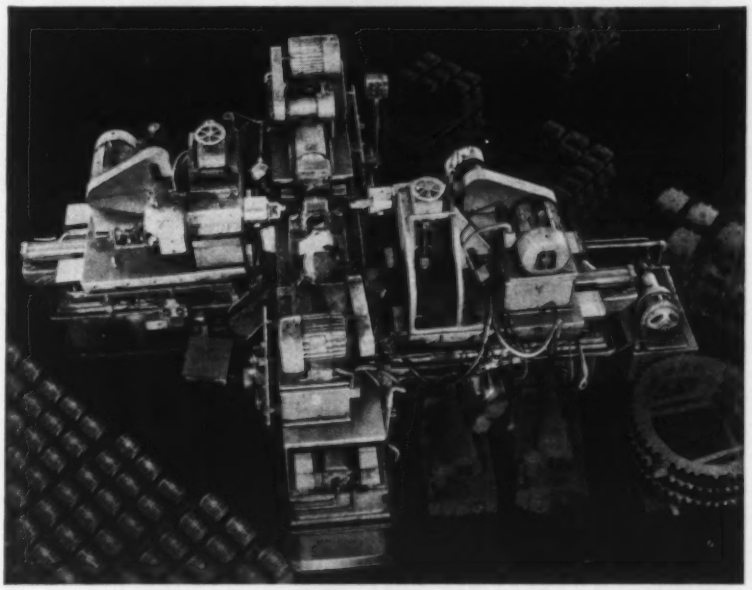
Thor Buys Italian Firm

Thor Power Tool Co., Aurora, Ill., acquired sole control of FIAP (Fabbrica Italiana Apparecchi Pneumatici), Turin, Italy, producer of air tools. Concurrently, Thor acquired a substantial minority interest in FIAP Espanola, Barcelona, Spain.

Will Equip Tractor Plant

Allis-Chalmers Mfg. Co., Milwaukee, plans to convert the building housing the former No. 2 foundry at the West Allis (Wis.) Works into a tractor production facility. Consolidation of gray iron foundry production facilities was completed last fall. Plans call for installations of a welding department, machinery operations area, and shipping and loading facilities by the end of the year. A depart-

(*Please turn to Page* 100)



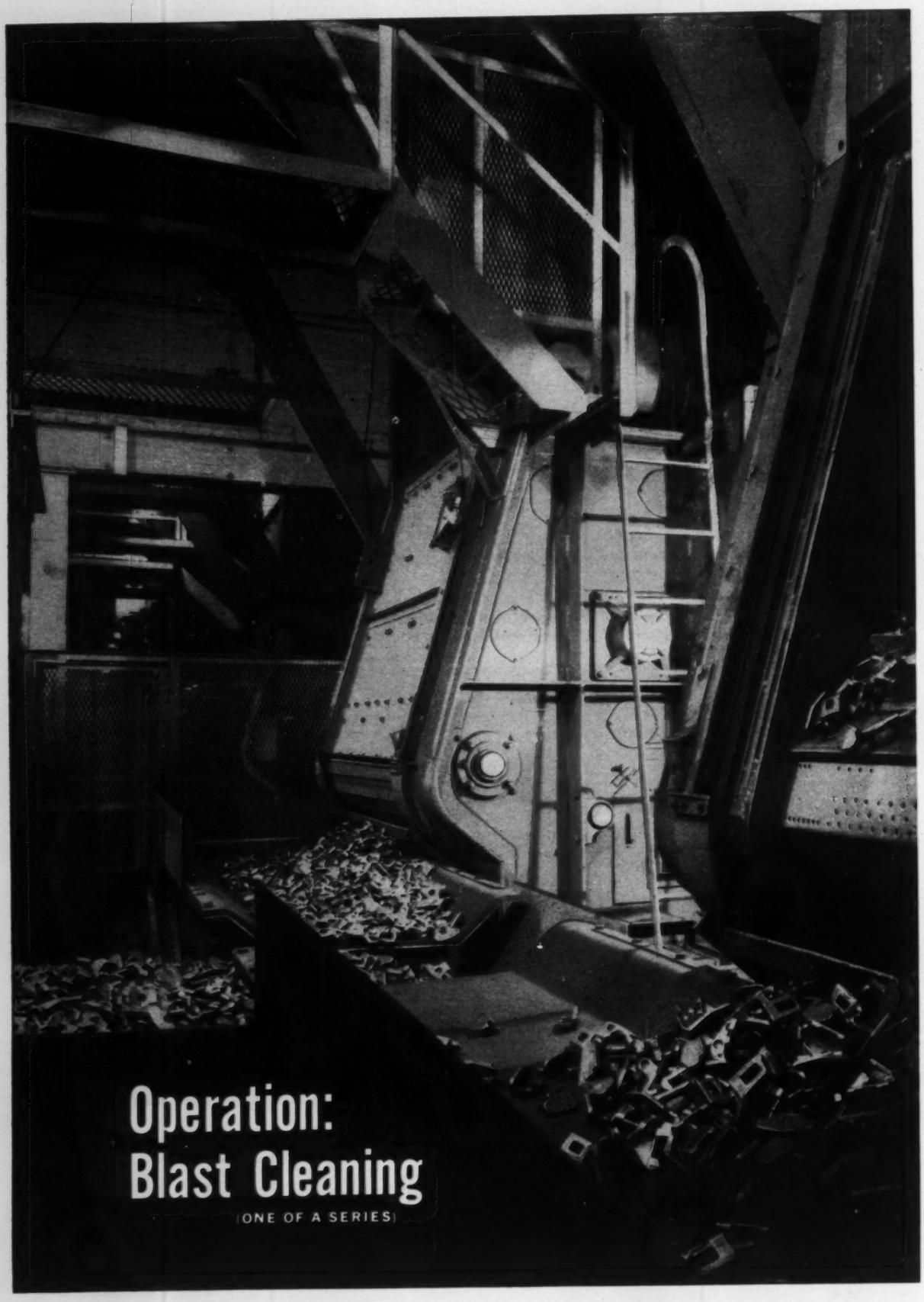
This pays off years from now!

Long life and low maintenance costs in a speed reducer are direct results of original accuracy and quality. Cone-Drive speed reducer housings are machined on this special 4-way boring machine to "tenths", assuring exact alignment of the **double-enveloping worm** and gear used.

Accurate Cone-Drive gearing is available in gearsets, speed reducers and gearmotors.

CONE-DRIVE GEARS

DIVISION MICHIGAN TOOL CO.
7171 E. McNichols Rd., Detroit 12


Operation:
Blast Cleaning
(ONE OF A SERIES)

Six of seven 32 cu. ft. Rotoblast cleaning barrels stand in line at a large, midwestern automotive foundry. Only two men are needed to operate all six. (Tote boxes in foreground automatically receive cleaned castings.)

BIG JOB, BIGGER RESULTS WITH ROTOBLAST

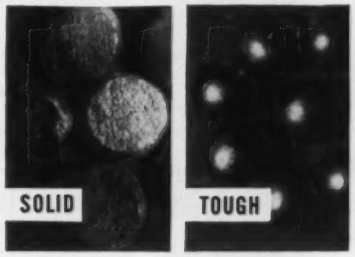
Day in, day out seven heavy duty Rotoblasts work hard at cleaning the tremendous volume of castings produced at a large, famous automotive foundry in the Midwest. At last count, each of the seven barrels had accumulated more than 600 hours of actual blast time with practically no need for maintenance or repairs.

Proof of the almost completely automatic operation of these machines is that just two men operate a line of six! (The seventh has a separate location for materials handling convenience.)

Whether your cleaning needs are big or small, Rotoblast has a standard unit for the job or can provide specially designed equipment. Labor-saving automation can be built into a single, small unit just as easily as into seven big ones.

We'll be glad to go into more detail. Just write: PANGBORN CORPORATION, 1600 Pangborn Blvd., Hagerstown, Md. *Manufacturers of Blast Cleaning, Vibratory Finishing, Dust Control Equipment—Rotoblast® Steel Shot and Grit©.*

Try Rotoblast abrasives, too!



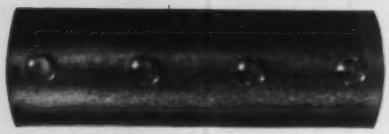
A special, heat-treating process makes Rotoblast Steel Shot and Grit solid, tough, able to take more punishment than ordinary abrasives. Because they are *extra* tough, Rotoblast abrasives last longer, work harder and lower your replenishing costs.

Pangborn
OF HAGERSTOWN

ALLEN

Allenpoint's deep, full-circle bite assures tremendous resistance to removal torque! Stays tighter longer!

When you need a set screw that you can depend on to stay tight under heavy strain and vibrations, specify ALLENPOINT. Here's why you can always depend on ALLENPOINT: proper design of the cup diameter results in a rugged grip that makes the full-circle pattern you see here . . . deep, strong, clean sockets allow full wrenching leverage . . . and uniform Class 3A threads assure a tight friction lock over the entire length of Allenpoint Set Screws.



Ask your ALLEN Distributor for samples and full engineering details—he's always ready, willing, and able to give you prompt, practical service!

ALLEN HEAD

ALLEN MANUFACTURING COMPANY

HARTFORD 1, CONNECTICUT, U.S.A.

(*Concluded from Page 97*)

ment also will be established for the manufacture of hydraulic pumps.

Buys Trackwork Business

Midwest Steel Corp., Charleston, W. Va., purchased the Trackwork Div. of H. K. Porter Company Inc. The manufacturing facilities will be moved from Huntington, W. Va., to Pomeroy, Ohio, but Midwest Steel officers will remain in Charleston.

Opens Refractory Facility

Refractories Engineering & Supplies Ltd., Montreal, Que., has placed in operation facilities at Bronte, Ont., for the manufacture of high magnesia, basic refractory mixes. The products are used primarily by the steel industry and are manufactured under license from Kaiser Refractories & Chemicals Div., Kaiser Aluminum & Chemical Corp., Oakland, Calif. The raw material, periclase, is shipped from the U. S. to the Bronte facility.

Metalonics Corp. Formed

Metalonics Corp. has been organized at 40 W. Third St., Boston 27, Mass. The firm is operating an 800 ton extrusion press and specialized equipment for drawing, coiling, cutting, and straightening metals. Initial operations emphasize the extrusion of high performance and clad metals in the form of rods and special shapes. Tubing is expected to be added later.

Officers include: Chairman, Houlder Hudgins; president, N. R. Gardner; senior vice president, M. J. Smith; vice presidents, F. M. Yans and A. D. Donaldson; and treasurer, Wells Morss.

Harvill to Occupy New Plant

Harvill Corp. will lease a $1.3 million manufacturing facility being built in the Rancho San Pedro industrial area near Compton, Calif. The 101,000 sq ft plant will increase Harvill's capacity by more than one third for the manufacture of diecast metal and plastic products. Operations of American Aerophysics Corp., acquired last

Typical steam forging hammer

REQUIRED SAFETY FACTORS in steering arm assured by designing it to be forged

By designing with forgings, a truck manufacturer can count on the required safety factors, with minimum "beefing-up" of parts to offset unknown internal structures or non-homogenious materials.

You, too, can achieve results like these by designing *with forgings* either at the start or on re-design. The benefits of forgings are equally impressive, whether you make home-workshop equipment or diesel engines.

Forgings start as *better* metal . . . are further *improved* by the hammer-blows or high pressure of the forging process.

Write for literature on the design, specification, and procurement of forgings.

When it's a vital part, design it to be FORGED

Drop Forging Association • Cleveland 13, Ohio

Names of sponsoring companies on request to this magazine

TOO SLOW ?

Emphatically not! . . . ask any visitor to the 1960 Machine Tool Exposition who watched a Marvel No. 6 Hack Saw Machine cut-off 3¼" diameter 1018 steel in 27 seconds! This Saw, costing less than $3000, was actually cutting at the rate of 18 square inches per minute!

We made the above demonstration merely to "match" what we believe to be the impractical demonstrations of some of our competitors. OUR visitors were warned that continuous cutting at this speed is economically impractical if maximum blade life and accuracy (after the first 20 cuts) are desired. They were told that the material could be cut day in and day out, at the rate of 8 square inches per minute with tool cost of approximately 1 cent per cut.

Our point? Marvel No. 6 and No. 9 Series Heavy Duty Ball Bearing Hack Saw Machines, as we build them today, have speed to spare. And they offer the most accurate, economical cut-off at the lowest initial investment.

Ask your Marvel Dealer to arrange a sawing demonstration—on your own work—if you wish. Because we have consistently built both Hack Saws and Band Saws for more than 40 years, you will get an unbiased recommendation.

Catalog C60 illustrates and describes the complete line of Marvel Sawing Machines. Write for your copy.

MARVEL *Metal Cutting* **SAWS**

BETTER MACHINES
BETTER BLADES

ARMSTRONG-BLUM MANUFACTURING CO. • 5700 Bloomingdale Avenue • Chicago 39, Illinois

S-1318

month by Harvill, also will be transferred to the new plant.

Canada Wire Expands

Canada Wire & Cable Co., Toronto, Ont., has completed a $250,000 expansion of its Ft. Garry, Man., plant. Additional equipment and manufacturing facilities have been installed.

ASSOCIATIONS

National Constructors Association, Washington, elected these officers: President, H. E. Lore, Dravo Corp., Pittsburgh; vice president, George Collins, Lummus Co., New York.

Power Crane & Shovel Association, New York, elected these officers: President, L. C. Black, Bucyrus-Erie Co., South Milwaukee, Wis.; vice president, H. B. Halloran, Manitowoc Engineering Corp., Manitowoc, Wis.; secretary, H. S. Blake Jr., and treasurer, D. V. Reed, both of Organization Service Corp., New York.

NEW PLANTS

Industrial Stainless Steels Inc. is building a 40,000 sq ft steel warehousing building at Sixth and Binney Streets, Cambridge, Mass. It will contain 5-ton electric cranes, shears, and other cutting equipment. The firm is a subsidiary of Eastern Stainless Steel Corp., Baltimore.

H. M. Harper Co., Morton Grove, Ill., opened a warehouse at 8530 LaPorte Freeway, Houston, Tex. A complete stock of nonferrous and stainless steel fasteners will be carried.

Cambridge Wire Cloth Co., Cambridge, Md., opened a wire cloth warehouse facility at 7009 Long Dr., Houston 17, Tex. E. F. Pink is warehouse manager. C. E. Shuman is in charge of the Houston sales office.

Federal Pacific Electric Co., Newark, N. J., is establishing a six plant

(*Please turn to Page* 106)

FIRST

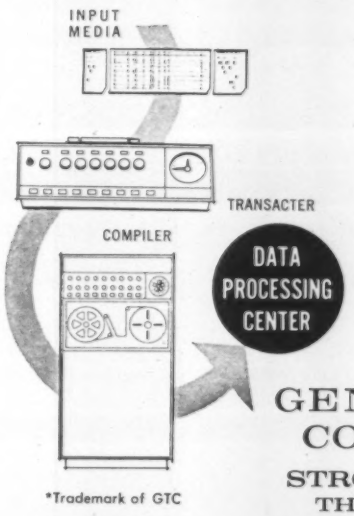
with the Solution

The TRANSACTER* System — the fastest proven method of accurate instantaneous data collection and transmission — provides management with complete data on production status and order location, inventory control, labor costing, tool crib and stores control, receipt and shipment, on-line communication. These are just a few of the many potential assignments for the TRANSACTER System.

Until Stromberg developed the new TRANSACTER System, no accurate, instantaneous method of source data collection existed. Industrial data collection and transmission was a relatively primitive operation — dependent on manual recording and delivery — subject to human fallibility every step of the way. Such methods were incompatible with the accuracy and efficiency of EDP and computer speeds.

The TRANSACTER System eliminates the paper work between widely scattered data sources and a central processing office. Management reports that have taken days — sometimes weeks — can now be produced in minutes! With the TRANSACTER System dramatic new opportunities for profit improvement become evident.

Write for informative booklet.

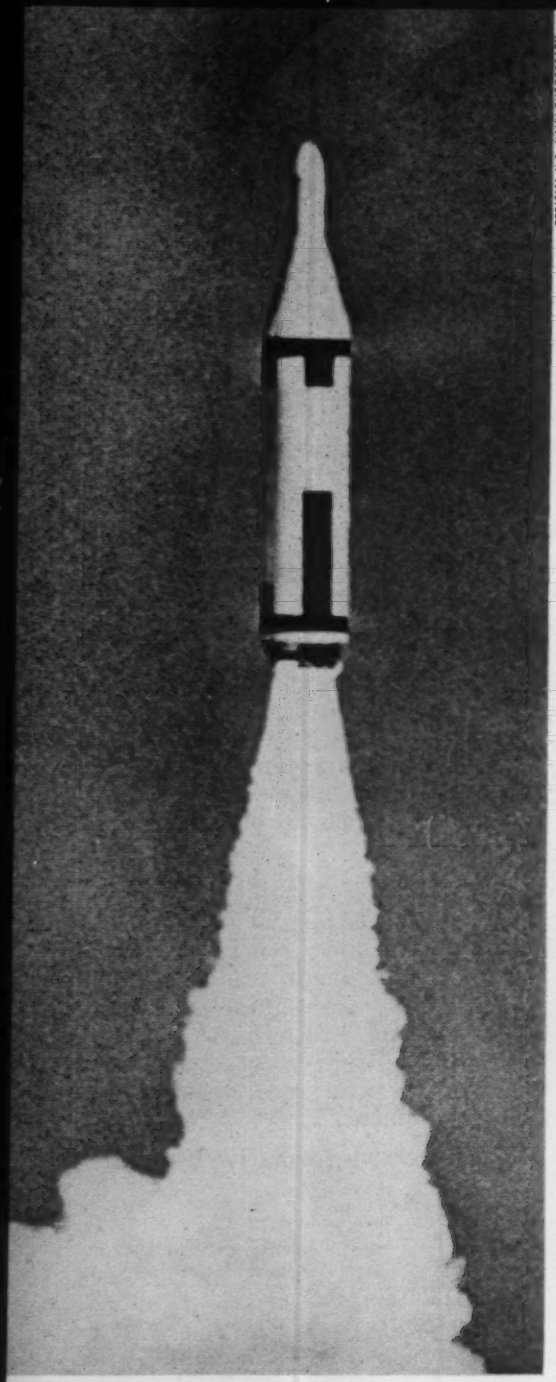


*Trademark of GTC

GENERAL TIME CORPORATION

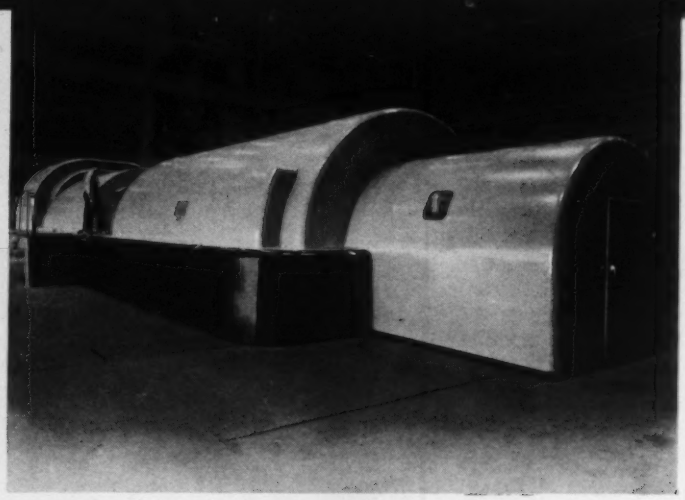
STROMBERG DIVISION
THOMASTON 4, CONN.

Makers of the World's Finest Time Equipment

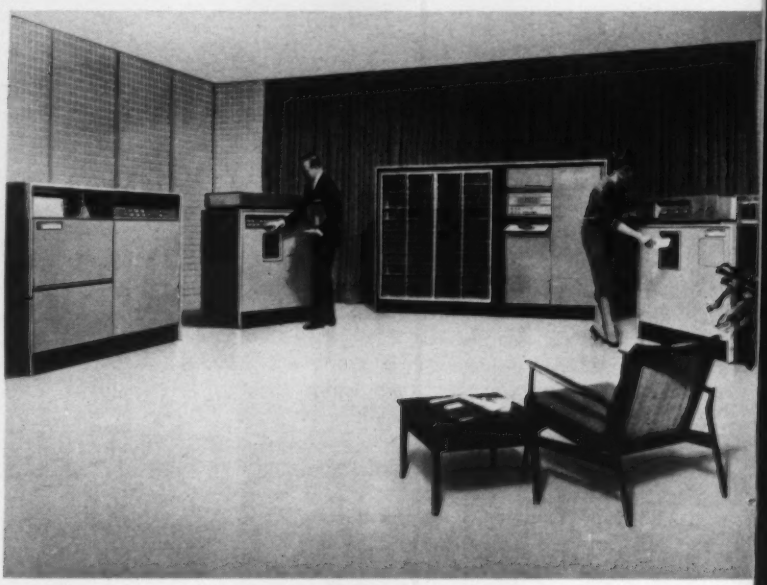


OFFICIAL U.S. NAVY PHOTOGRAPH

Three quarters of the globe serves as launching pad for this Polaris missile designed for subs. Carpenter Stainless forgings assure predictable performance.



Less heat, more power. Hydrogen gas cooling system on this fully super-charged steam turbine demands thin-walled rectangular stainless tubing. For extra strength and uniformity Carpenter Stainless Type 304 was specified.



The "big brain". Carpenter Electronic Alloys provide vital links in these advanced solid-state computing systems. Example: Carpenter HyMu "80" strip is used for pickup heads to help guarantee the necessary high reliability.

Steel

you can do it consistently better with

The Carpenter Steel Company, Main Office and Mills, Reading, Pa.

High flying hybrid. "Blucket" is half fan blade, half turbine bucket. Made from Carpenter High Temperature Alloy V-57, "bluckets" are used in new jet engines for the world's fastest airliner. Here Carpenter quality provides extra measure of safety.

$50,000 toys. That's the cost of tooling up for one of these scale models. Manufacturer specifies "Carpenter No. 484 Tool Steel—no substitute."

Smiles and miles. Joy to pedal pushers everywhere are these bicycle speedometers. Pointer shafts must be reliable . . . are manufactured from Needle Wire from Carpenter's Webb Wire Division.

Coast to coast off-the-shelf specialty steel service is available in wide range of sizes and grades. Over twenty fully-stocked Carpenter SERVICE-CENTERS ...all staffed by trained specialists.

Carpenter Specialty Steels for Specialists

Alloy Tube Division, Union, N. J. / Webb Wire Division, New Brunswick, N. J. / Carpenter Steel of New England, Inc., Bridgeport, Conn.

it's Jewel Bright

takes tough twists without

FLAKING, POWDERING, or PEELING

CONTINENTAL®

Brytite®

A PATENTED GALVANIZING PROCESS

CHAIN QUALITY WIRE

The Zinc Coated Wire with the Plated Look

Brytite Wire is so shiny bright and satin smooth that electroplating and special finishing operations are not needed —a valuable saving in labor and materials! The coating is so tight that it withstands severe deformation of the base metal—takes hard turns and twists without flaking, powdering, or peeling.

In Many Sizes, Finishes, Tempers and Analyses

Specify BRYTITE in Satin Finish, Unwiped, or redrawn (in certain sizes) . . . in various tempers and analyses in low carbon and medium low carbon steels . . . for quality weldless or twisted wire chain, or wherever long-lasting brightness is desired. Special shapes, too.

Free Manual of Continental Manufacturers' Wire. Contains details of BRYTITE and other types of Continental Wire. Write for copy.

Fine Finishes in Manufacturers' Wire

CONTINENTAL STEEL

CORPORATION—KOKOMO, INDIANA

PRODUCERS OF: Manufacturers' Wire in many sizes, tempers and finishes, including Galvanized, KOKOTE, Flame Sealed, Coppered, Tinned, BRYTITE, Annealed, Liquor-Finished, Bright, and Special Shaped Wire. Also Reinforcing and Galvanized Fabric, Nails, Continental Chain Link Fence, and other products.

(*Concluded from Page* 103)

complex in that city to manufacture electrical switchgear. Heart of the operation will be a 70,000 sq ft switchgear assembly plant (cost: $500,000) which will be fed components manufactured in the five other connecting plants.

NEW ADDRESSES

Sandvik Steel Inc. moved its Chicago branch office into the company's new 16,428 sq ft building at 7520 N. Long Ave., Skokie, Ill. R. C. Hofmann is the Chicago district manager.

Klemp Metal Grating Corp. moved several divisions into enlarged quarters at 1132 W. Blackhawk St., Chicago 22, Ill. They include the Industrial Grating Div. and the Klemp International Div.

Detroit Electric Furnace Div., Kuhlman Electric Co., will move from Bay City, Mich., to 11405 E. State Fair Ave., Detroit 34, Mich., on Mar. 1.

General Kinematics Corp.'s headquarters are now at 132 W. Northwest Highway, Barrington, Ill. The company makes vibratory process equipment.

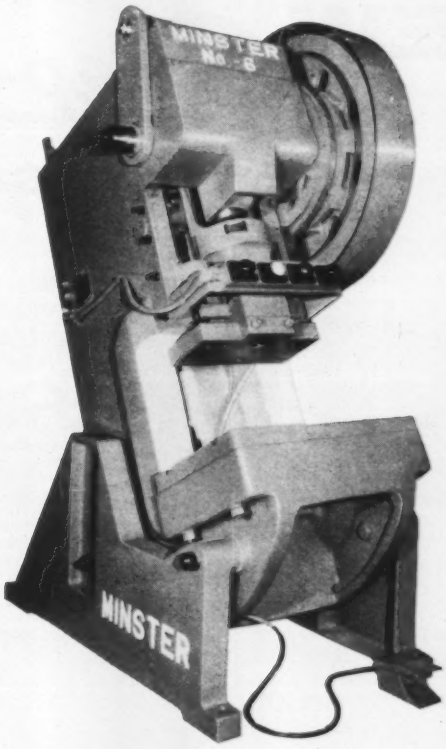
CONSOLIDATIONS

Atlas Powder Co., Wilmington, Del., and the **Stuart Co.**, Pasadena, Calif., will merge, subject to approval of shareholders. Stuart would operate as the Stuart Div. of Atlas.

Bell Intercontinental Corp., New York, acquired **Cincinnati Galvanizing Co.**, Cincinnati, producer of galvanized household and commercial products. Bell will operate the property as a division.

Koppers Co. Inc., Pittsburgh, acquired controlling interest in **Thomas Flexible Coupling Co.**, Warren, Pa., and will continue operations in that city.

Chromalloy Corp., New York, acquired **Shunk Mfg. Co.**, Bucyrus,



TAKE A LONG, HARD LOOK

at the "hidden strengths and values" found only in a Minster O.B.I. press. Quality is not always visible at first glance. The fine points of design and construction which mean the difference between good performance and superior performance can easily be overlooked.

When evaluating O.B.I. presses, carefully compare clutches, slide areas, recirculating lubrication systems, and inclining mechanisms. On any size—16 through 250 tons—a Minster O.B.I. offers you more value for your money. Ask a Minster representative to prove it.

The Minster Machine Company, Minster, Ohio

MINSTER®

NEW Snap-on

128-PAGE TOOL CATALOG

send for your FREE copy

Here is a complete, 128-page hand and power tool buying guide for purchasing agents, engineers, production and maintenance officials — anyone concerned with the use of hand tools for assembly, maintenance, field service and original equipment repair kits.

Every type and size of tool is identified by number for quick, easy ordering. Important dimensions and specifications are clearly listed. Popular sizes of sockets and attachments designed expressly for powered nut runner and impact wrench use are included.

Also included is a complete range of automotive tools and shop equipment for fleet maintenance operations.

Ask the SNAP-ON Sales Engineer who calls at your plant for your FREE copy. Or write direct.

FOR ALL INDUSTRY

SNAP-ON TOOLS

8021-B 28th AVENUE • KENOSHA, WISCONSIN

Ohio, manufacturer of replaceable blades and cutting edges for earth moving, road construction, road maintenance, and snowplow equipment. Chromalloy will operate the firm as a wholly owned subsidiary under the presidency of R. W. Burman.

NEW OFFICES

A. O. Smith Corp., Milwaukee, opened a sales office in Indianapolis for its Electric Motor Div., manufacturer of fractional, integral, and hermetic motors in its Tipp City, Ohio, plant. The office is under the direction of R. J. Rashilla.

Okonite Co., Passaic, N. J., established branch offices at 2829 E. Second Ave., Denver 6, Colo., and at 1799 Huber Rd., Charleston 4, W. Va. J. F. Angle is in charge of the Denver office; J. P. Oblinger at Charleston. The company is a subsidiary of Kennecott Copper Corp., New York.

Triax Co., Cleveland, established a district office at 8920 S. Constance Ave., Chicago, under the managership of J. F. Kowack. The company makes mechanical material handling and storage systems.

Commercial Shearing & Stamping Co., Youngstown, established a district sales office at 10701 W. National Ave., Milwaukee 19, Wis. Don C. Melcher is district manager.

Bloom Engineering Co., Pittsburgh, opened a sales and engineering office at 11506 Reading Rd., Cincinnati, Ohio. William Page is in charge of the office. The firm makes industrial gas and oil burners.

Dayton Industrial Products Co., a division of Dayco Corp., Melrose Park, Ill., established a regional office and warehouse at 3401 Tremley Point Rd., Linden, N. J. The new facilities will include the Dayton Industrial operation formerly located at Hillside, N. J. Ellis Earich is manager. The division makes a wide range of products for the automotive, general industrial, graphic arts, and allied fields.

STEELMAKING AT JESSOP

Listen...

5...4...3...2...1...0...Lift Off!

The countdown is on.

Scientists and skilled technicians scan their instruments, alert to the least sign of malfunction.

Liquid oxygen has been piped into the fuel chamber of the gleaming Atlas ICBM poised on the launching pad. Other last-minute preparations are completed.

Tension mounts. It won't be long. Listen . . .

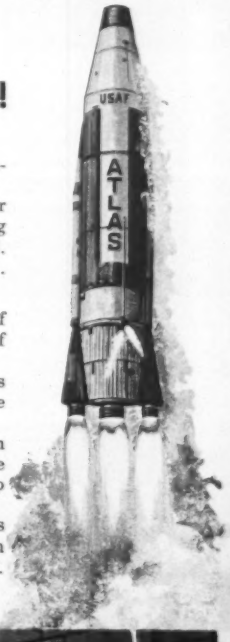
5...4...3...2...1...0...*Lift Off!*

The missile comes to life in a swirling cloud of vapor, exhaust and flame. The engine—capable of 360,000 pounds of thrust—roars thunderously.

Airborne now, the Atlas gathers speed and soars majestically on its predetermined course down the Atlantic range—a successful launching.

Jessop Steel Company makes several alloys used in the Atlas—steels forged and machined into precise but rugged mechanisms. And you will find Jessop steel in the launching pad "plumbing" too.

Swepco Tube Corporation of Clifton, N. J., makes piping for LOX systems that fuel the Atlas with liquid oxygen at temperatures of –300° F. to –320° F. *That's* punishment for any metal.



But Swepco's austenitic chromium nickel Rock-Forged pipe can take it. Ductility—to avoid fracture by reason of brittleness—is an all-important factor in this application.

With a value of about 38 foot pounds by Charpy Impact Test, the piping supplied by Swepco handles the job with ease—with an added measure of safety against costly breakdown.

Swepco buys steel from Jessop for rock-forging. Why? Because through controlled chemistry and certain production techniques, Jessop and Swepco developed a steel second to none in workability in the cold forging process.

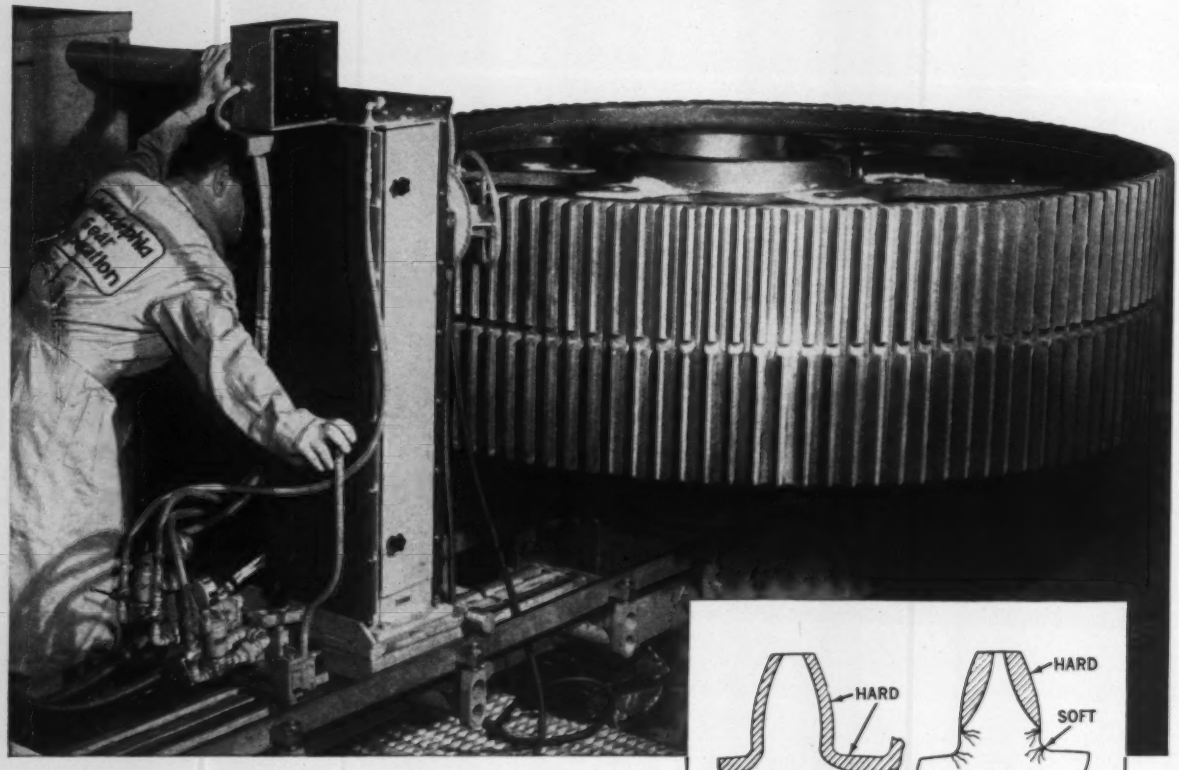
In making steel like this, experience counts . . . and Jessop has it. Call any of Jessop's 23 sales offices in North America and let us prove it to you.

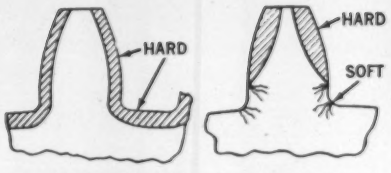
Plants and Service Centers:
Washington, Pa. • Los Angeles • Chicago • Detroit • Owensboro, Ky. • Wallaceburg, Ont.

JESSOP

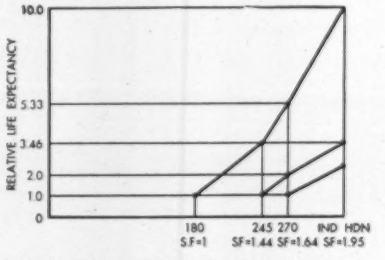
TECHNICAL OI

New Philadelphia induction hardening increases life of large gear drives . . .





New Philadelphia full contour induction hardening (left) provides a continuous hardened area from one tooth flank around the root and up the other flank without interruption. There are no points of stress. Typical heat treated gear (right) shows inadequate hardening of root of tooth, a point of major stress.



This chart shows the relationship between load and gear life. Note that the improved service factor of a gear set may be used to substantially increase gear life, rather than to increase the load.

HERE'S WHY: Full tooth contour induction hardening of large gears provides a uniformly hardened surface from one tooth flank around the root and up the other flank without interruption. Eliminates points of thermal stress concentration. And there is no distortion, a problem of heat treated gearing that requires subsequent grinding.

This new, advanced Philadelphia method permits radical reduction in sizing and/or increased load carrying capacities. And it can easily harden even the largest spur, helical and herringbone gearing up to 180 inches in diameter, 20 inches in face, and 3/4DP.

Learn more about this new method for increasing the service life of your gear drives. Write for your copy of Bulletin 100.

phillie gear® / **PHILADELPHIA GEAR CORPORATION**
King of Prussia (Suburban Philadelphia), Pennsylvania

ROCKET NOZZLES IMPROVE—Porous tungsten nozzles made of sintered powdered metal (it can withstand 6170° F) are being touted for rocket engines. Besides resisting high temperatures, the sintered shapes permit these cooling approaches: 1. Gases can be pushed through. 2. By including a composite metal, the heat of the rocket blast will melt and vaporize the second phase, producing a substantial cooling effect. (It's like sweating.)

SPEEDS SOLDERING— A whistlemaker increased soldering production 12 times by substituting a coarse and a medium grained brass strip for the single fine grained type formerly employed. Forming characteristics of the two new grades offset the different spring characteristics of inner and outer pieces and improve fitup and joint wettability during the one-shot soldering operation, says Bridgeport Brass Co., Bridgeport, Conn.

BETTER PLUTONIUM—Scientists at Los Alamos Scientific Laboratory have developed an electrorefining cell which can turn out 99.98 per cent pure plutonium from material that is 97.5 per cent pure. The technique is expected to boost chemical and metallurgical research.

NUCLEAR EFFICIENCY BOOSTED—A high temperature device that employs cesium gas and a uranium cathode is being built by General Electric Co., Schenectady, N. Y., to increase the output of nuclear power generators. Intended for future reactor designs (it is built into the fuel elements), the device will convert high temperature heat directly into electricity; low temperature heat would continue to pass through coolant-steam generator systems as at present.

PROPOSES STEEL CODING— A new system for identifying low alloy steels would employ only three symbols—one for critical size (as related to quenching), one for temperature at which martensite starts to form, one for potential tempering hardness. The proponent, Dr. Rafael Calvo Rodes, Institute e Nacional de Technica, Madrid, Spain, says his system describes a steel from the users' standpoint; he has devised a slide rule calculator based on the three variables which permits a user to select a steel and define its proposed composition.

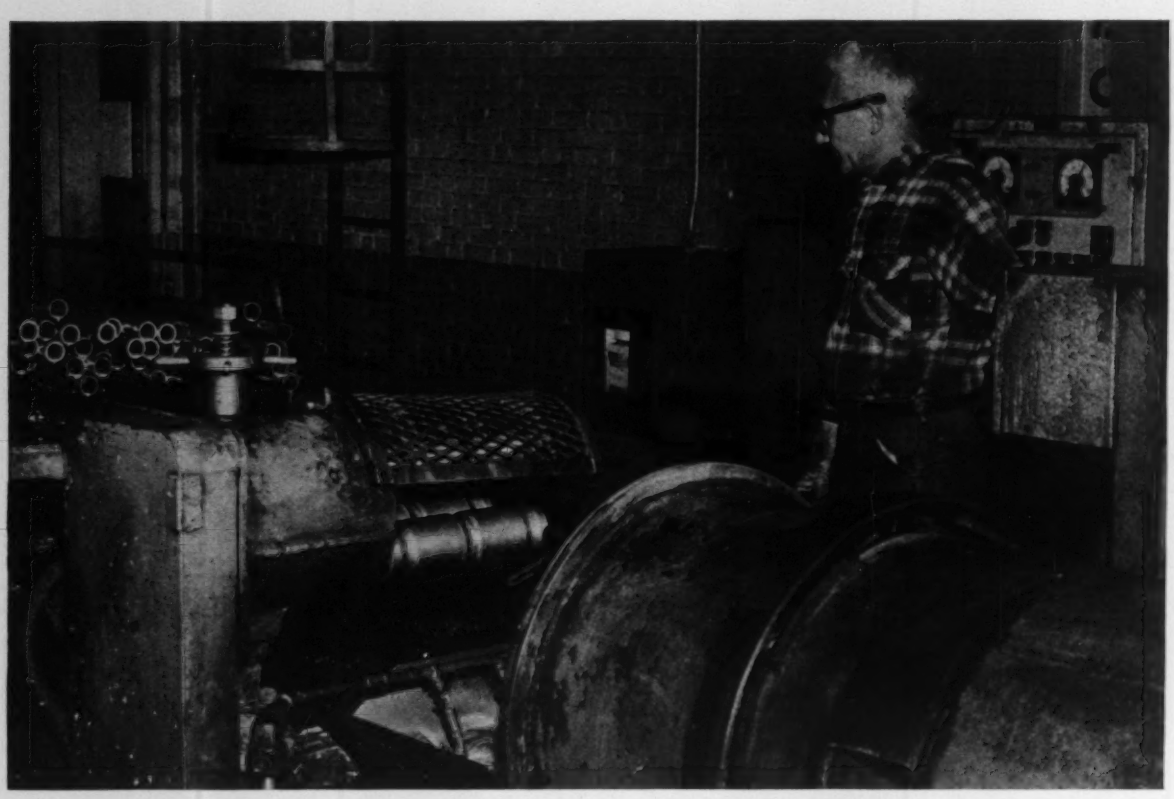
STUDY HIGH RATE FORMING—Techniques and effects of forming metals with electrospark discharges and electromagnetic forces are being studied by Republic Aviation Corp., Farmingdale, N. Y., under a contract from the National Aeronautics & Space Administration.

ENGINE BLOCK TRENDS—Detroit reports that an auto firm is studying a V-6 engine block that has a design similar to that of diecast types but is cast in gray iron in quick-bake sand cores and molds. Savings in coring, shakeout, and machining are expected to make up the cost in differential between sand casting and diecasting. The design is 100 lb heavier than its aluminum counterpart.

SOUND CHECKS AGE—The Air Force is working on an ultrasonic technique for detecting signs of aging in bonds.

TITANIUM DIBORIDE ADVANCES—Suppliers of titanium diboride expect the aluminum industry to find a number of major applications for their product: 1. Cathodes. (They might cost $10 a pound vs. 8 cents for steel, but their ability to handle greater current density would boost electrolytic cell efficiency and capacity.) 2. Thermocouple protection tubes which are submerged in molten cryolite or aluminum (both highly corrosive). They could last up to five months vs. five days for some metals now in use.

HIGH TEMP STAINLESS—"Stainless steels with a high nickel content appear most suited for high temperature applications in oxidizing atmospheres," state engineers at the liquid rocket plant (Sacramento, Calif.) of Aerojet-General Corp.



Recorder correlates drawbench speed, motor current. It shows how . . .

Machine Overloads Can Be Avoided

WILLIAM J. SCHULTZ
Manager, Recording Instruments Engineering
Instrument Dept.
West Lynn, Mass.
General Electric Co.

and

WILLIAM MUIRHEAD
Application Engineer
Industrial Sales Operation
New Haven, Conn.
General Electric Co.

SIMPLE instrumentation virtually eliminates drawbench breakdowns caused by overloading in brass tube and bar drawing operations at Bridgeport Brass Co., Bridgeport, Conn.

A specialized, strip chart indicator-recorder built for the company by General Electric Co.'s Instrument Dept., West Lynn, Mass., helps program production runs at machine capacity. The instrument makes it possible to monitor load characteristics during production, and warns of overloads that might cause breakdowns.

• The device indicates deviation by the drawbench from full load operation.

The company relies on the instrument when a drawbench is being set up for production runs. Programers can easily determine the number of tubes or bars a bench can handle, by making trial runs and keeping an eye on the recorder chart. Maximum acceleration and speed are then established by bringing the pen almost to the point of maximum load indication.

Continuous records are logged on the strip chart so drawbench operators can be warned of upcoming overloads by glancing occasionally at chart trends.

The instrumentation was first installed more than two years ago on a 50,000 lb, constant potential drawbench. Similar equipment was later installed on a second bench—an adjustable voltage, 36,000 lb unit. No mechanical trouble caused by overloads has shown up on either bench since the instruments were installed.

• The instrument developed at General Electric combines positive and

negative torque, so that any combination of speed and current falling on the maximum load line will create equal and opposite torques.

It indicates only deviations from the maximum load, and ignores the specific values. A direct current, tachometer-generator and a direct current transformer, with a 1000 to 1 ampere ratio, provide torque signals for the instrument.

• A strip chart recorder is used as the indicating component, since Bridgeport wants records of drawbench performance.

A modified, two element wattmeter, of the electrodynamometer type, combines the torque signals in the recorder. Motor current is fed into the upper element, creating a counterclockwise torque. The lower element interprets speed as a clockwise torque. A calibrating resistance in the speed circuit balances the torques. The scale is suppressed so the instrument covers a range of 300 to 1300 amperes.

The balance point (maximum load indication) is set at 80 per cent of chart scale. Acceptable drawbench loads cause the instrument to record below the 80 per cent level; overloads push the pointer into the red zone on the chart.

Slight modification adapts the instrument to use in the adjustable voltage system. Bucking rectifiers and a regulated, direct current supply, equal to the tachometer-voltmeter output at basic speed, are added to the circuit. If bench speed drops below the basic value, negative torque in the instrument remains constant.

Above basic speed, the tachometer output exceeds the regulated supply and operation proceeds normally.

• The danger of drawbench damage from overloading is inherent in the machine's drive requirements.

Drives usually include direct current motors, with Ward Leonard speed adjustment systems that extend speed characteristics over field and armature ranges.

Motors are normally applied on the basis of full torque at top speed. An alternate method—full torque at basic speed — limits productivity when speeds above the basic value are used.

But the full torque-top speed method also has a serious drawback: The motor develops enough torque at basic speed to overload the drawbench.

The motor and the control circuit don't sense the condition as an overload, because the excessive torque is well within the electrical rating of the motor. Result: The drawbench can be damaged by an unexpected overload.

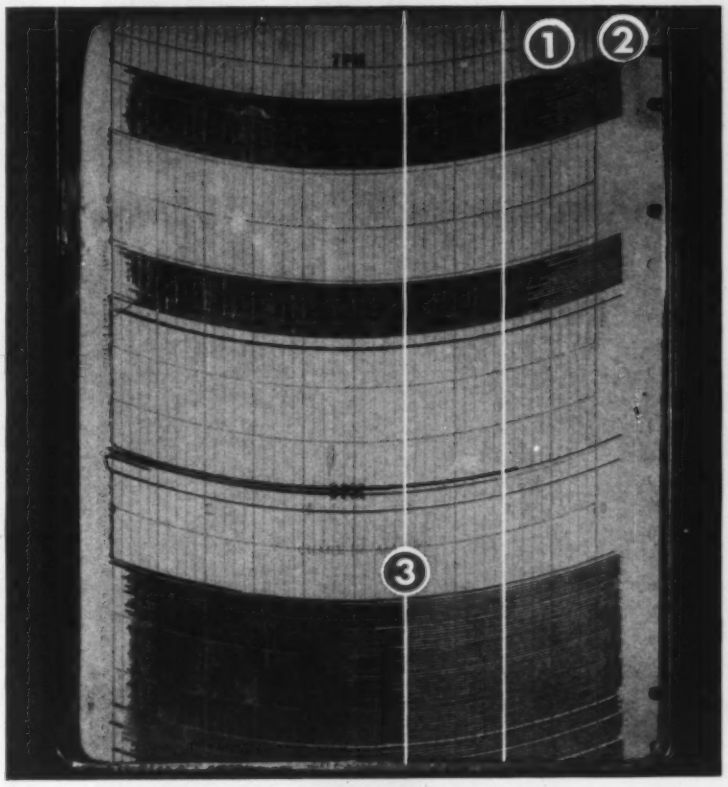


Chart readings above 80 indicate overloading (1); fine lines to margin (2) show machine reversals. Underloading is shown by short traces (3)

• The company began some years ago to plot curves of draw speed vs. motor current.

Formulas developed from those curves helped the engineers at Bridgeport to schedule benches at maximum productivity. But the formulas still didn't define the intangible factors in overloading. So Bridgeport called on General Electric engineers for help.

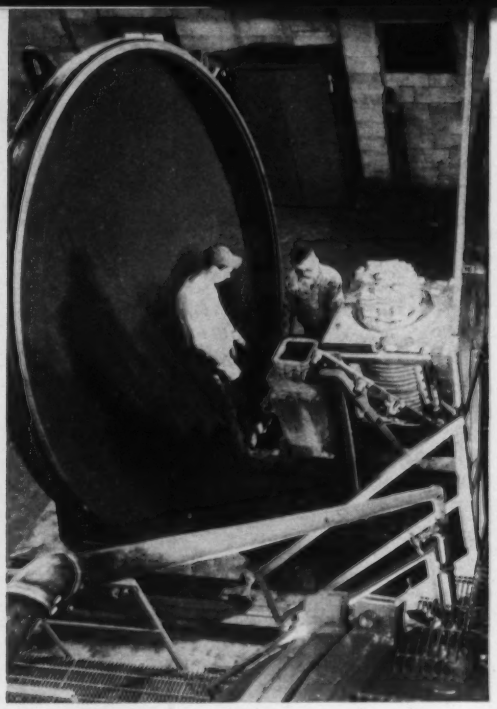
First approach: A strain gage or load cell with amplification and indication.

The system met all performance specifications, but was ruled out because it would have required considerable drawbench alterations.

An instrument that measured only electrical quantities and could be installed without mechanical alterations seemed more feasible.

Use of an instrument that combined drive motor current and draw speed was suggested by William Mitchell, electrical engineer at Bridgeport Brass. Draw speed-current charts indicated that stress was directly proportional to motor current multiplied by the reciprocal of draw speed; an instrument based on that mathematical function would indicate stress directly. But such an instrument would have required complex circuitry for computation of the speed reciprocals. For that reason, the companies abandoned the approach as impractical.

Mr. Mitchell then agreed that the presence of an overload is more important than its measurement, so a linear function would be used instead of the reciprocal. Using that principle, a close approximation is readily obtained.



Melting units (above)

Vacuum Units

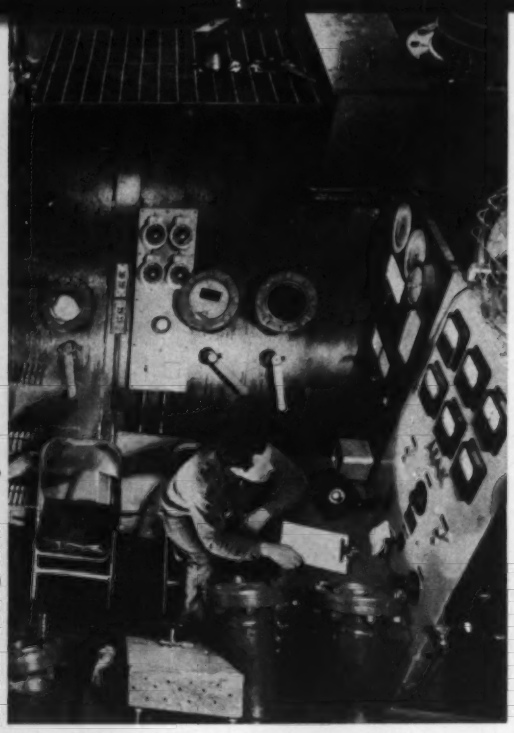
INVESTMENT CASTINGS with tailored properties are being produced in vacuum equipment at Haynes Stellite Co., Kokomo, Ind., a division of Union Carbide Corp.

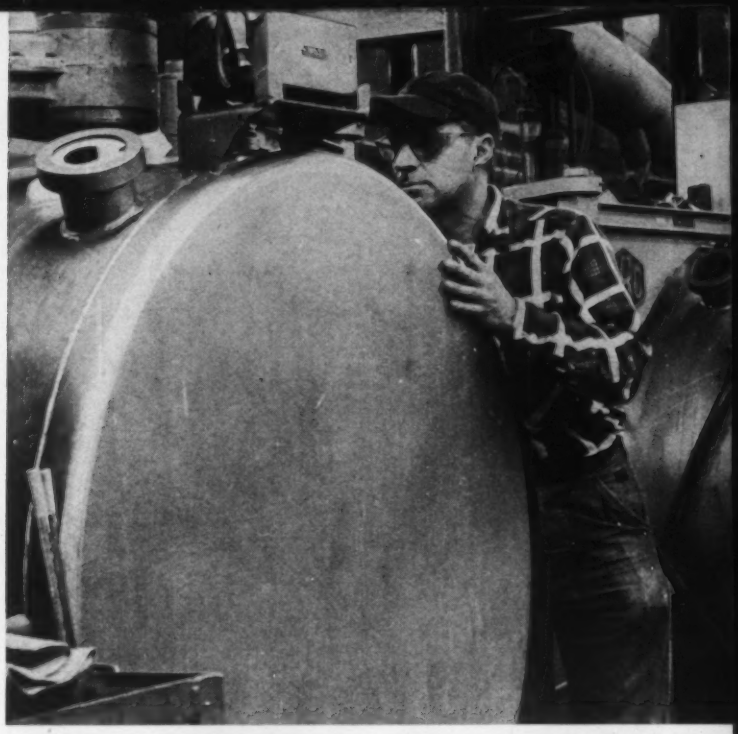
For example, Haynes engineers say they can produce controlled variations in casting grain size so optimum benefits can be obtained from an alloy.

• Smaller grains on the trailing edge of a turbine blade show how grain control aids performance of the part.

Some of the blades with a 1/16 in. grain throughout showed a strong tendency to crack along the trailing edge, where thermal shock is most severe. To produce desired properties through the blades, Haynes is putting 1/16 in. grains in the body of the blade and 1/64 in. grains on the trailing edge.

Operator (left) charges alloy into the air lock on a continuous vacuum unit. The sealing is never broken; since the chamber does not have to be pumped out each time, the cycle is speeded up





and crucibles (right) make up an integrated vacuum casting line

Enhance Investment Castings

The relatively fine grain size boosts fatigue and thermal shock resistance properties; coarser grains in the heavy section are credited with maintaining good rupture strength. The alloys being cast are nickel base, with aluminum and titanium added. Additions up to 11 per cent enhance high temperature properties.

The trick to controlling grain size is reported to be in the close monitoring of melting, molding, and pouring practices.

The company plans to use the relatively expensive, vacuum investment casting process to turn out parts where optimum properties are required. Advantages cited by the company include: Close control of chemical composition (within ½ of 1 per cent), higher mechanical properties, absence of gas contamination, cleaner casting surfaces, and no backup pressure from mold gases—so thinner sections can be cast.

• The company is also applying diffusion coatings on a semiproduction basis.

Where environmental temperatures might soar as high as 2300° F, the engineers are adding diffusion coatings of either nickel-aluminum or iron-aluminum materials. The company says: "Useful oxidation resistance has been imparted to certain alloys at temperatures near their melting points. Useful resistance to residual fuel ash has also been indicated."

Potential applications for diffusion coated parts include jet engine blades, hardware items for jet engines and rocket motors, heat shields, and fuel handling equipment to resist nitric acids.

• Ceramic coring lets engineers design for greater hole depth ratios.

Preformed ceramic insert coring makes it possible to cast holes and internal surfaces not produced by other methods, the company says.

For example, holes have been investment cast (on a development basis) with length-to-diameter ratios of more than 200 to 1, in lengths up to about 8 in. The technique permits normal production runs with cored holes with a 30 to 1 ratio for lengths up to about 10 in. deep. That compares, the company feels, with an ordinary ratio of about 6 to 1 for somewhat shorter holes.

• New equipment boosts Haynes's capacity for investment castings.

Capacity for producing 90,000 lb of vacuum poured castings a month at a rate of 400 molds a day was recently completed. That volume will not tax the company's primary vacuum refining facilities used for the production of wrought as well as cast vacuum alloys rated at 300,000 lb a month. More than 350,000 vacuum investment castings have been sold, and the company feels that demand for vacuum castings will increase — principally in the field of nickel base, precipitation hardening alloys.

Company officials also expect castings made of reactive metals to gain in importance.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

Vibration Finishing Ends Deformation of

DEFORMATION in finishing small and medium sized parts can be avoided. The key: vibration deburring. It can be utilized for cleaning, descaling, radiusing, fine finishing, coloring, and internal finishing.

Empire Spring Co., Elyria, Ohio, can attest to advantages of the vibration technique. It has found that deburring by that method enhances endurance properties of thin, tempered spring parts.

Not only can it handle delicate parts that could not be successfully or economically finished by other techniques, but it does a wide range of work in greatly reduced time cycles.

• In one case, the vibrator was able to perform the required finishing operation in less than 2 per cent of the time previously required and with better results.

R. N. Dean, Empire's general manager, says the Lorco machine it installed produces a three way movement. Not only does the entire mass in the machine rotate within its bowl, but there is a relative motion between the parts and the media in the mass which produces a scrubbing action.

• The process can handle parts as small as 0.250 x 0.002 in. The range extends up to medium sized screw machine parts and castings.

Most of the parts processed by Empire are flat spring metals. Some are as thin as 0.002 in. Others range up to 0.060 in. Burrs are removed, edges are rounded, and the natural metal color is brought out to a high polish. No bending or interlocking occurs. In addition, heavier parts made of bar stock up to 1½ in. in diameter have been processed readily (many with heavy burrs). Mr. Dean says the finishing technique permitted cutting away such burrs instead of bending them over and peening the ends of the parts.

• The scouring action produces a surface with low microinch readings that is suitable for electroplating.

Toolmarks, oxides, and scale are removed. Empire says it's unusual to find blistered plating on parts with surfaces properly prepared in the vibrator. Hydrogen embrittlement is greatly reduced. The company also believes that the action of the media against the parts in the vibration process induces desirable residual stresses into spring surfaces.

• A wide variety of materials can be processed effectively.

Metals finished by Empire include straight carbon and alloy steels of spring temper, stainless steels, beryllium copper, Inconel,

Processing and Materials Employed for Parts Shown

		Quantity	Speed (rpm)	Run Time (hours)	CHIP SIZE	COMPOUND Type	COMPOUND Water (gal.)
1 STAINLESS STEEL	Step 1	12,000	1,200	2	5 & 7	HS-93 (4 lb)	3
	Step 2	12,000	1,000	½	—	Luster-All (3 lb)	3
2 ALUMINUM	Step 1	1,000	1,200	1	5 & 7	ZA (1 lb)	3
	Step 2	1,000	1,100	½	—	Luster-All (1 lb)	3
3 BRASS	Step 1	600	1,200	2	5 & 7	Cal (4 oz)	3
4 SPRING STEEL	Step 1	1,500	900	½	6 & 7	HS-9 (4 lb)	3
5 LOW CARBON STEEL	Step 1	1,400	1,000	4	4	HS-9 (3½ lb)	3
	Step 2	1,400	1,000	1/6	—	Luster-All (1½ lb)	3
6 ANNEALED STEEL	Step 1	5,000	1,200	2	5	HS-93 (4 lb)	3
	Step 2	5,000	1,200	¼	—	MC-3 (1 lb)	3

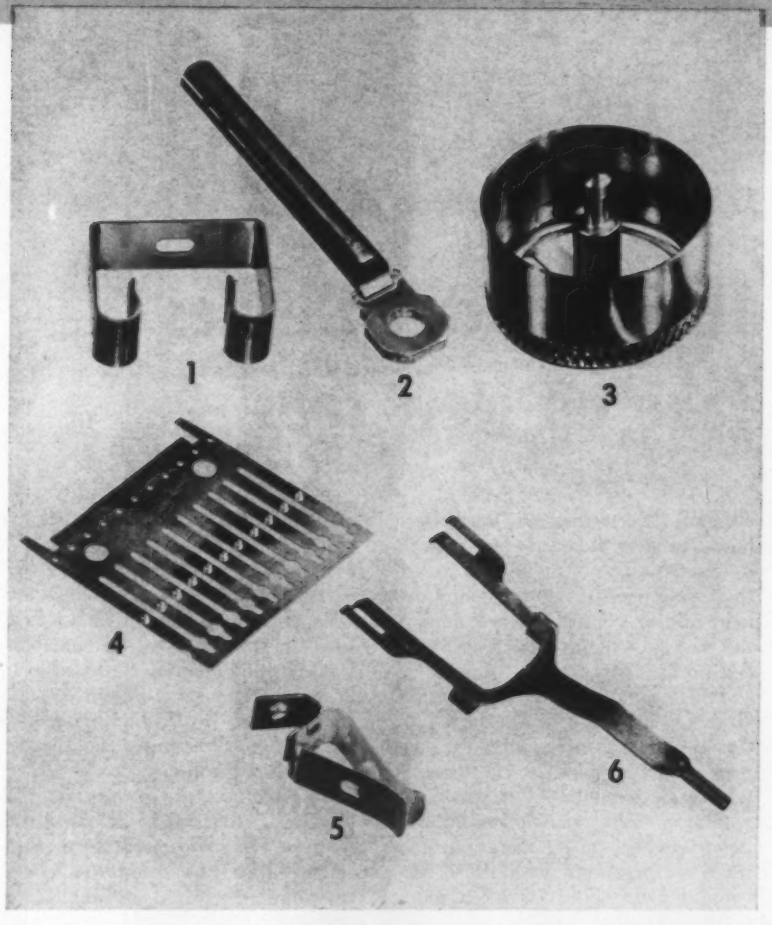
Light Parts

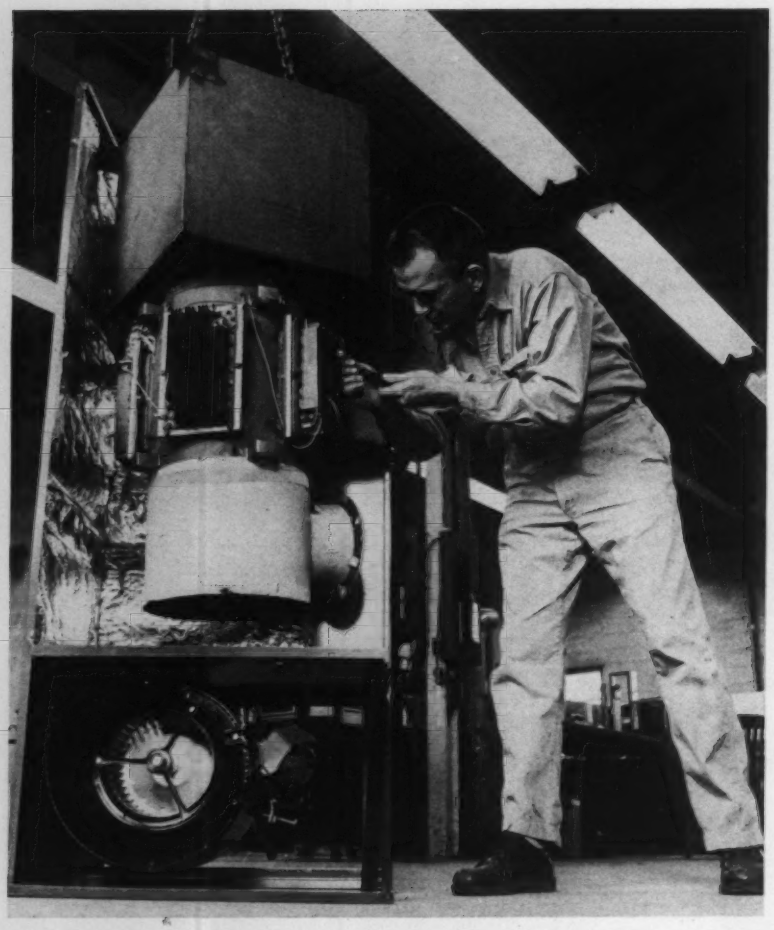
brass, phosphor-bronze, nickel, aluminum, precious metals, and Nitralloy.

Batches vary, but often are quite large. The company reports greatest economy when the batch is as large as the machine can handle (along with the media, compound, and water needed).

• Treatment depends on the type of material being processed and on the results specified.

Empire makes a process data card for every job and reviews these as new jobs and conditions come up. The machine operator or foreman refers to the cards for similar parts in handling new jobs. As a run is being made, the operator can reach into the bowl with his hand at any time and withdraw samples (without stopping or slowing the machine) to determine if the selection of conditions is getting the desired results.





Self-powered gas furnaces lead the way as . . .

Thermoelectric Devices Take on New Jobs

THREE thermoelectric devices—a home heating furnace that powers its own blower, a nuclear powered thermoelectric generator, and a temperature controller—are among the latest dividends from our Space Age technology.

The furnace was developed by C. A. Olsen Mfg. Co., Elyria, Ohio. Gas heats the furnace, and the furnace heats thermoelectric generators connected to the furnace blower motor. Electrical power failures have no effect on its operation, and room temperatures are uniform because blower speed is varied automatically to match furnace temperature.

The nuclear powered thermoelectric generator employs radioactive isotopes like curium 242 to heat 144 semiconductive elements to 1000° F. Potential applications: Power sources for unmanned radio beacons and weather stations, says the maker, Westinghouse Electric Corp., Pittsburgh.

The temperature controller, proposed by Irving I. Sochard, of Army's Diamond Ordnance Fuze Laboratories, Washington, can maintain electronic assemblies at 68 to 86° F when outside temperatures vary from minus 65° F to plus 160° F. (See STEEL, Feb. 20, p. 75.)

• The 130 watt furnace generator is said to be one of the largest ever applied to a residential heating system. It converts heat from gas directly into enough electricity to run the blower.

The application brings these significant improvements to conventional home heating, claims Ronald N. Campbell of Olsen: 1. Reliability is improved. 2. Installation costs are lower because no electrical connections are needed. 3. Monthly power bills are lower since it supplies its own power.

The thermoelectric principle enables the furnace to modulate air flow to fit heat generation. When the furnace goes on, power from the generator builds up gradually. As a result, air delivery reaches its maximum when the furnace operates at top speed.

Recent tests show that the new device generates about 130 watts at 9 volts. Furnace output is 80,000 Btu per hour.

• The nuclear device is only 10 in. high, 16 in. in diameter.

The radioactively powered generator produces 150 watts of electricity. It will operate for a year without recharging. Finned heat exchangers, which make the package look like a porcupine, keep the cold side of the elements at 300° F. A plus feature is ease of maintenance—the device has no moving parts.

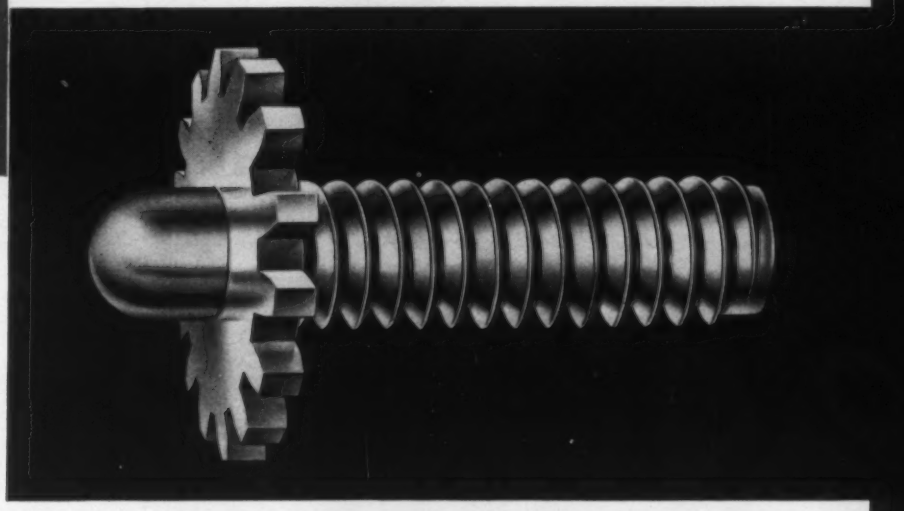
• The thermoelectric temperature controller for instruments is said to be simpler and lighter than previous devices for such applications.

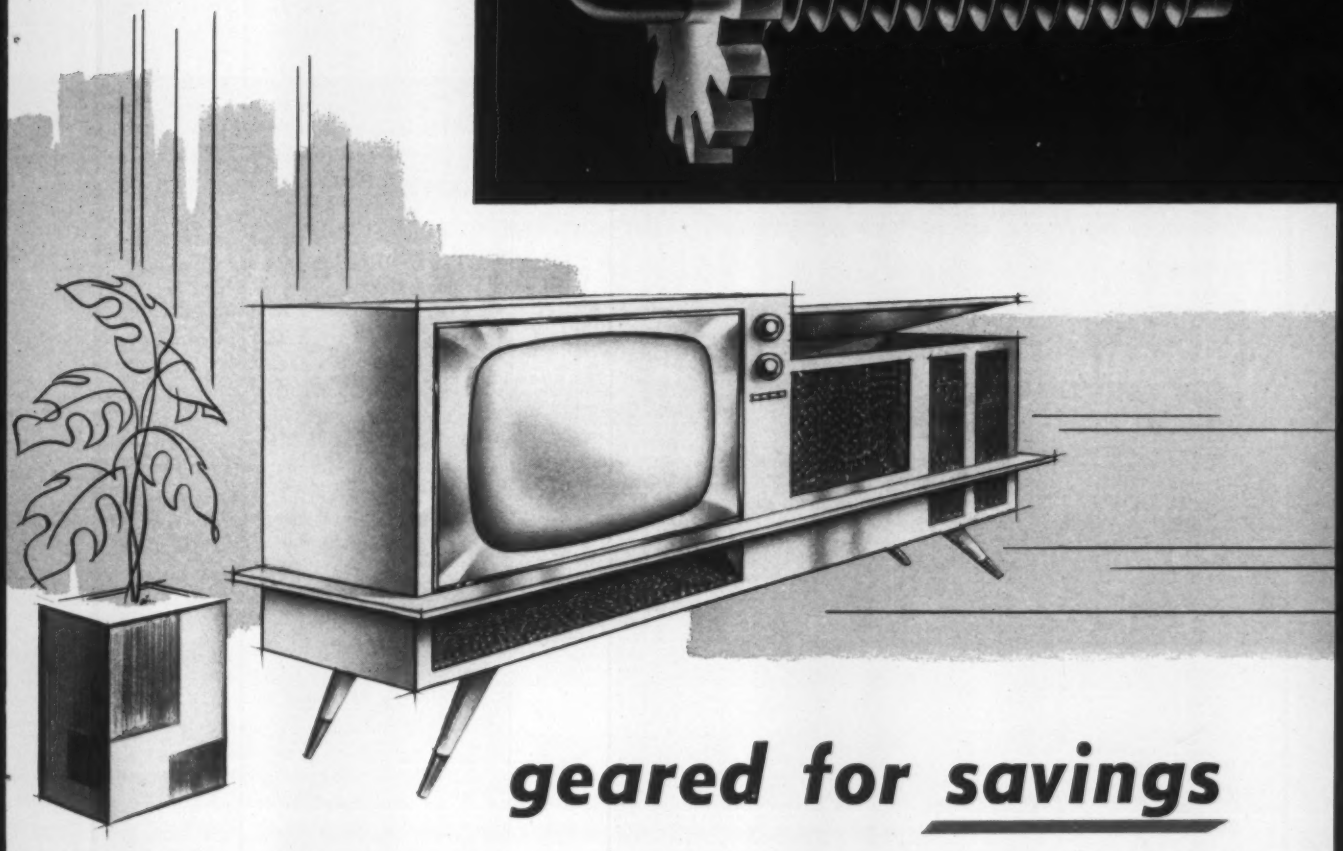
Here are three benefits:

1. If such a cooling unit is properly designed, it can reduce development time for electronic equipment. Reason: Fewer temperature problems. 2. Circuit reliability is increased because fewer components are needed. 3. Cost can be reduced. In dense electronic packages, unit costs are often $2000 per cubic inch. Cooling for that volume runs about $100.

One unit which Mr. Sochard designed has 18 thermocouples, operates on 1.5 or 2 volts with a 6 watt input.

approved
by the
television
INDUSTRY





geared for savings

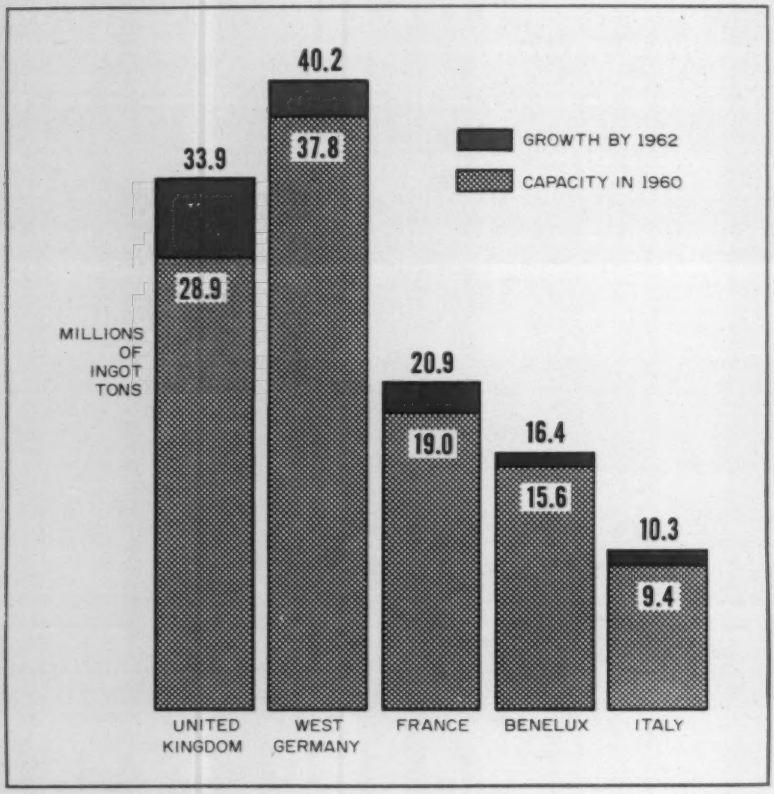
For almost two decades, Great Lakes Screw Corporation has been creating precision fasteners for the Radio Television industry. The gear head tuning screw pictured is typical of the "Specials" that GLS Engineers have made standard to provide the economies and strength of cold heading with the close tolerances normally found only in expensive screw machine parts. If your product contains "Specials" which, due to close tolerances or complex design, you feel can only be made on an expensive screw machine — Call the man from GLS and let him show you how the part pictured above saved one of the countries largest television manufacturers over $75,000 per year. GLS can do this for your product too. *We're geared for savings.*

GSL

GREAT LAKES
SCREW CORPORATION

EXECUTIVE OFFICES • CHICAGO 27, ILLINOIS

British Steel Makes Gains; May Seek More Markets



STIFFER COMPETITION for world markets is expected from the British steel industry in the early sixties. One reason: Its crude steel capacity is growing faster than domestic demand.

Ingot capacity in the United Kingdom was 28.9 million net tons in 1960—about one-fifth that of the U. S. It will rise to about 30 million tons in 1961 and to about 33.9 million tons in 1962, the British Iron & Steel Research Association predicts. Capacity expected by 1965: About 38 million tons.

Demand for crude steel in Britain isn't expected to exceed 27.4 million tons in 1961.

• Expenditures for expansion and replacement of British steelmaking facilities in 1960 were the highest in history. And more spending is expected.

Capital spending in the British steel industry last year came to about $364 million—25 per cent more than in any previous year.

Many of the expansion projects have been completed. New plate mills were put into operation at Consett Iron Co. Ltd., and at South Works of South Durham Steel & Iron Co. Ltd.; a new melt shop and slabbing mill were also built at South Works. Coke, sinter, pig iron, and rolling capacity were increased at John Lysaght's Scunthorpe Works Ltd., Scunthorpe. And facilities for production of alloy and specialty steels were rebuilt at Hallside Works of Colvilles Ltd.

Operating efficiency has been improved, and the productivity of manpower has climbed to a new high. Coke rates have been reduced considerably through the increased use of sinter in the country's blast furnaces. But other costs (fuel and labor, for example) have increased enough to offset benefits from more efficient operation.

Still more spending is in store for 1961—the total is expected to reach a record $420 million.

• Facilities for the production of flat rolled products are being given the greatest emphasis in capital improvement programs slated for the early sixties.

An L-D melt shop; a 68 in., continuous, hot strip mill; and a 66 in., cold reduction mill are scheduled for completion early in 1962 at Llanwern, Newport. Those projects are the first steps in construction of Spencer Works, a new, integrated plant being built by Richard Thomas & Baldwins Ltd.

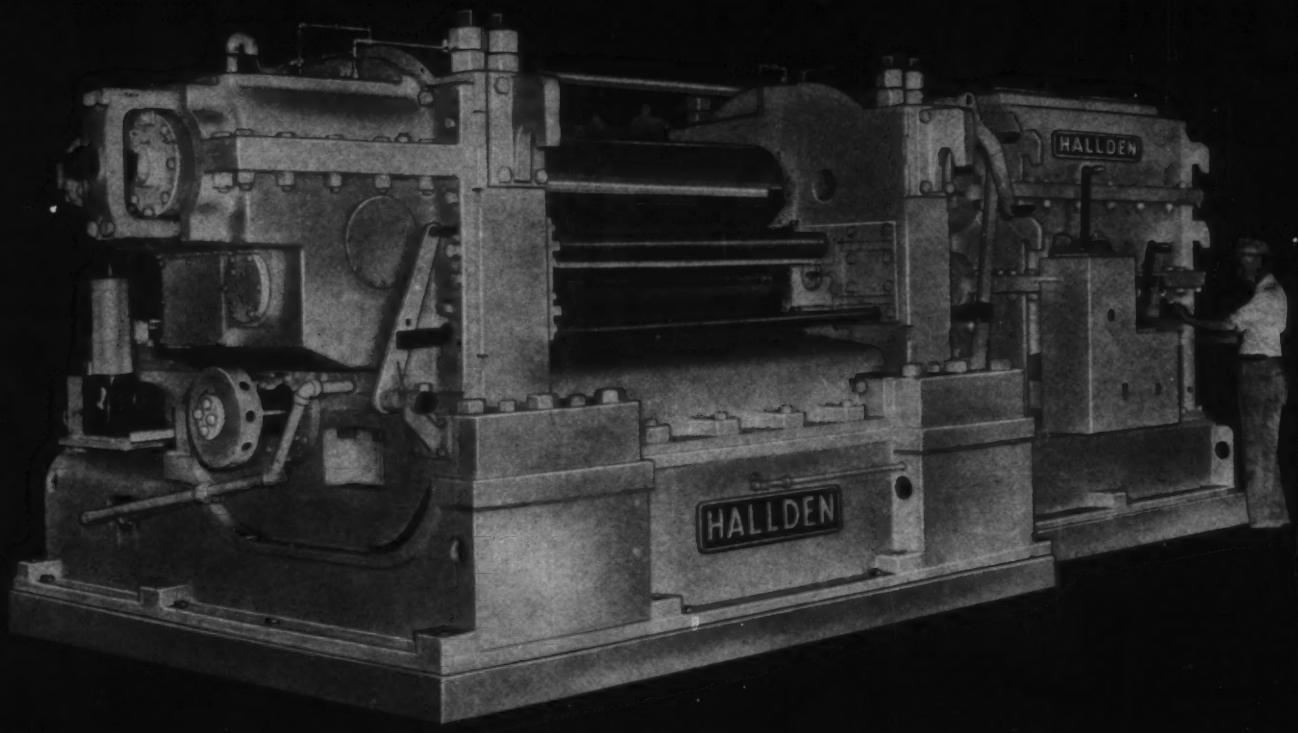
A new cold mill will be put into operation late in 1961 at Gartcosh, by Colvilles Ltd. The company will have a new, 60 in., hot strip mill ready for use at Ravenscraig in 1962.

Immediate expansion plans at Steel Co. of Wales include increased melting capacity and a new, two strand, continuous casting plant for slabmaking at the company's Abbey Works, Margam, South Wales. Both projects are to be finished in 1961.

• New melting and finishing equipment is being installed in other product areas.

Completion of two new Rotor furnaces—for prerefining—and a new mill will add to billet capacity at Redbourn Works, Richard Thomas & Baldwins. Oxygen steelmaking is also getting a boost at South Durham's South Works, where two L-D furnaces and two Kaldo vessels are being installed in a new melt shop.

Universal beam mill stands are being added to heavy section mills at Colvilles' Lanarkshire Works, South Durham's Cargo Fleet Works, and at United Steel Companies' Appleby-Frodingham Works, Scunthorpe.



SYNCHRONIZED ROTARY SHEET SHEARS

Combine Accuracy, Speed, Durability

- **Infinite length-of-cut control**
- **Full synchronization**
- **Minimum adjustment**
- **Reliable performance**

All these features are assured by such Hallden design extras as hardened torque correcting surge gears, dynamically balanced components, precision fitted parts.

Hallden shears are engineered and built to meet the requirements for the most modern high speed strip processing lines.

For custom designed synchronized flying shears for all high production strip shearing, consult Hallden, the worlds foremost designers of flying shears.

HALLDEN

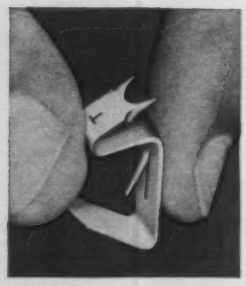
The world's leading machinery manufacturers rely on Hallden shears in their process lines

THE HALLDEN MACHINE COMPANY • THOMASTON, CONNECTICUT

Associates: The W. H. A. Robertson & Co., Ltd., Bedford, England

Another SPEED NUT Savings Story...

62% cost reduction made with **SPEED CLIPS**® on Cramer Posture Chairs



A dozen SPEED CLIPS now do the job of fastening upholstery to the steel seat of Cramer Posture Chairs. Before the switch to Tinnerman SPEED CLIPS, an expensive formed-steel rim was spot-welded to the seat to do this job.

SPEED CLIPS save Cramer at least 46 cents—or 62% of fastening cost—on each chair ... they eliminate the rim-forming and spot-welding operations... permit faster, easier assembly... simplify disassembly if the chair ever needs re-upholstering. Working jointly with Cramer's engineering staff, Tinnerman fastening specialists were able to provide all these advantages without sacrificing product quality.

Assembly costs on your product are likely to benefit greatly, too, if you'll enlist the aid of this Tinnerman team. You can arrange for a free FASTENING ANALYSIS of your product simply by calling in your nearby Tinnerman representative. You'll find him listed in the "Yellow Pages" and in Sweet's PD File under "Fasteners." Or write direct to:

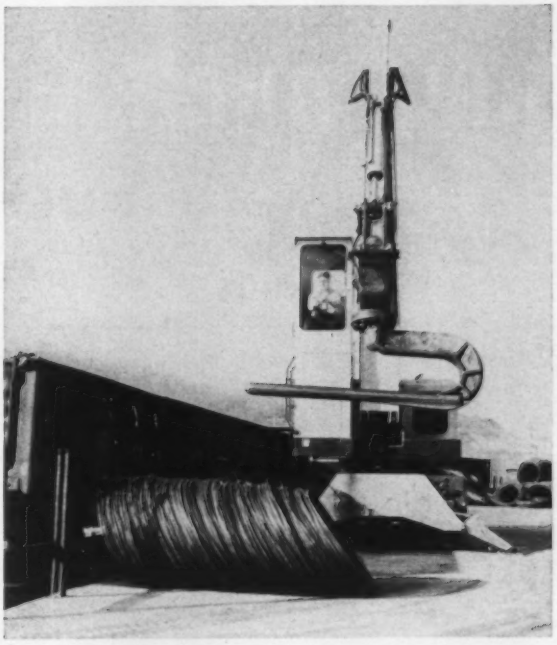
TINNERMAN PRODUCTS, INC.
Dept. 12 • P. O. Box 6688 • Cleveland 1, Ohio

TINNERMAN
Speed Nuts®

FASTEST THING IN FASTENINGS®

CANADA: Dominion Fasteners Ltd., Hamilton, Ontario. GREAT BRITAIN: Simmonds Aerocessories Ltd., Treforest, Wales. FRANCE: Simmonds S. A., 3 rue Salomon de Rothschild, Suresnes (Seine). GERMANY: Mecano-Bundy GmbH, Heidelberg.

Back Hoe Adapted For Coil Handling Ups Efficiency



A 6 ft hook unloads and stacks coils neatly

ONE MAN and a back hoe replaced eight men and two 25 ton cranes in unloading gondola cars and storing coiled wire rod at one of Colorado Fuel & Iron Corp.'s Wickwire Spencer Steel Div. plants at Palmer, Mass.

The unit is part of a revamped material handling system that provides cleaner, undistorted wire rod, and has resulted in higher efficiency and reduced handling costs.

- **The back hoe unloads the coils and a ram truck moves them into final storage.**

The unloader is a modified Hopto 500 made by Warner & Swasey Co.'s Badger Div., Winona, Minn. Modifications included elevating the cab 4 ft and moving it forward 1 ft to provide an unobstructed view and a remote control so the operator can propel the unit along the entire length of the unloading platform.

- **The 6 ft hairpin hook can be swiveled 240 degrees, tipped, and angled.**

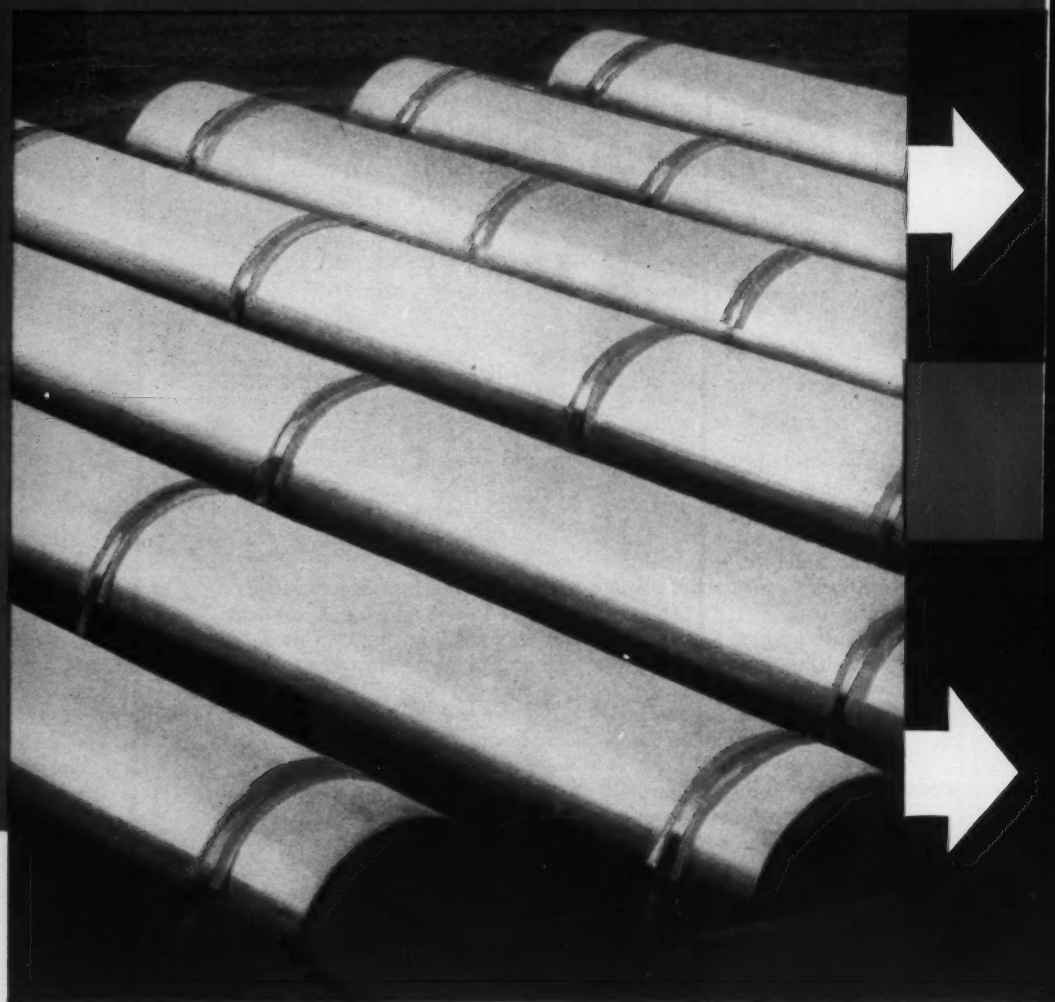
With one operator on the Hopto, the hook picks up six coils at a time and stacks them upright along the support rail for further handling by the ram truck. The concrete storage area, flatiron shaped, is pitched for maximum drainage.

In the original system, each of the two cranes required an operator, two hookers in the gondola car, and a man on the ground to disconnect the chain after each lift.

The maneuverable hook keeps rows concentric for further handling

new nuclear plants choose

FULFILLS THE EXACTING HEAT EXCHANGERS



Centrifugal stainless steel castings readied for shipment by U.S. Pipe

The Government's new SPERT III nuclear plant at the National Reactor Station near Idaho Falls, Idaho, operating since December, 1958 to study nuclear reactor safety, uses U.S. Pipe's centrifugally cast stainless steel pipe for its coolant system.

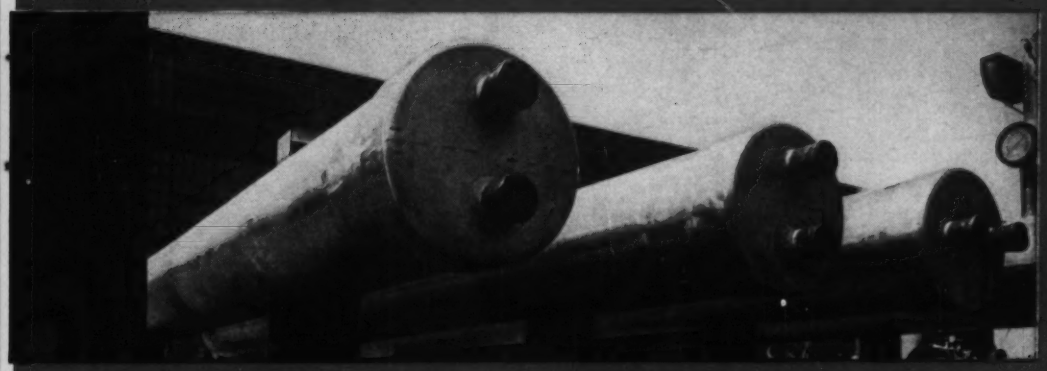
SPERT III is classified as a high pressure, high temperature, light water moderated and cooled reactor. Its versatility permits transient tests under various initial conditions of pressure, temperature, and coolant flow. For example, pressures ranging from atmospheric to 2,500 psi and water temperatures from 68° to 668° F.

Another new nuclear power plant, engineered and constructed by Stone & Webster for Yankee Atomic Electric Company, is using centrifugally cast stainless steel heat exchanger shells made by U.S. Pipe and fabricated by the Southwestern Engineering Company in Los Angeles, Calif.

Stainless steel, centrifugally cast, made to rigid specifications, may be the answer to your piping or heat exchanger problem. For more information, write or call:

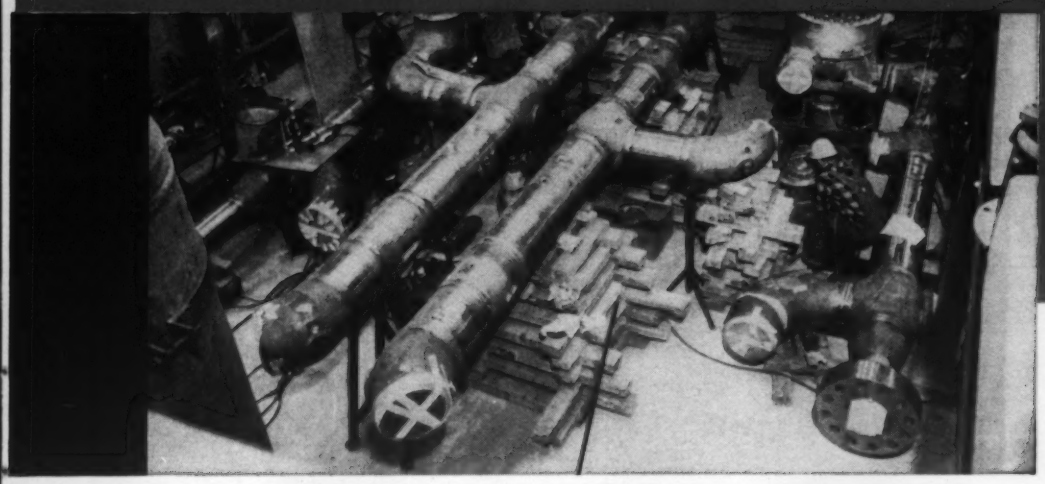
centrifugally cast stainless

REQUIREMENTS OF NUCLEAR AND COOLANT SYSTEMS



Shop-fabricated heat exchanger shells of centrifugally cast stainless steel ready for shipment to the Yankee Atomic Electric plant at Rowe, Mass.

Subassemblies of primary coolant piping of centrifugally cast stainless steel being installed in SPERT III.



ASA PRESSURE PIPING CODE STATUS

Approval has been granted under this code for the use of centrifugally cast austenitic pipe for nuclear piping by Nuclear Case N-9. This case appeared in the April, 1960 issue of MECHANICAL ENGINEERING. Reprints on request.

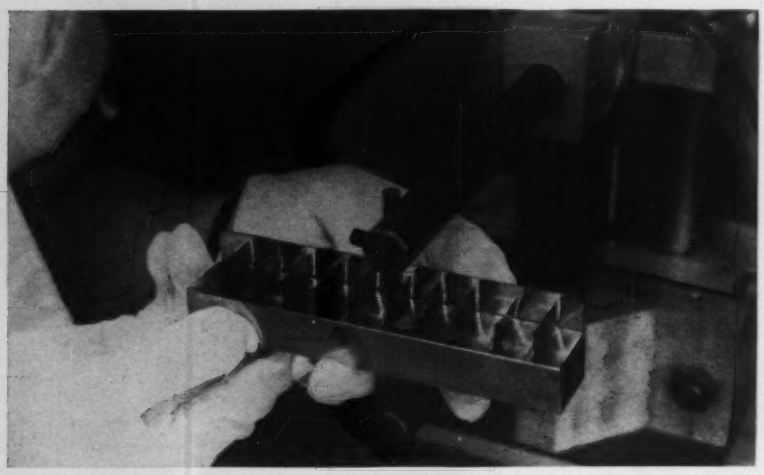
UNITED STATES PIPE & FOUNDRY CO.

Steel and Tubes Division

STEEL & TUBES U.S. PIPE DIVISION

BURLINGTON, NEW JERSEY

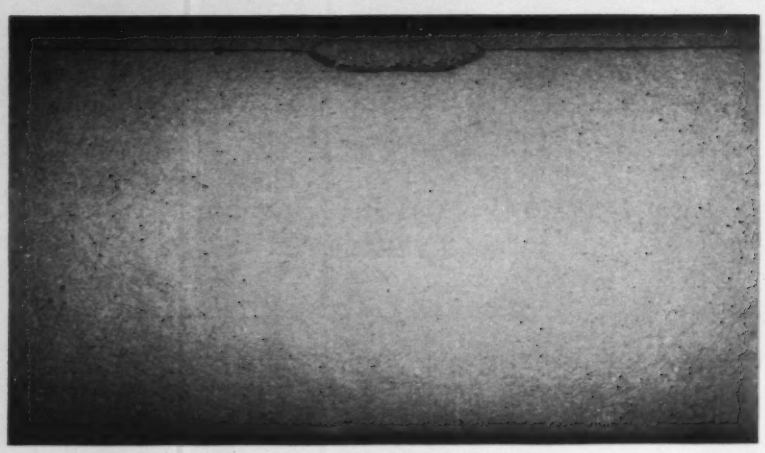
SALES OFFICES: BURLINGTON, BOSTON, BIRMINGHAM, CHICAGO, CLEVELAND, DALLAS, LOS ANGELES, NEW YORK, PITTSBURGH, SAN FRANCISCO



New technique overcomes differences in gage when . . .

Ryan Dotwelds Through Thick and Thin

. . . weld nugget forms equally in both pieces



A NEW resistance welding method permits Ryan Aeronautical Co., San Diego, Calif., to join sheets up to 0.016 in. thick to much heavier pieces of metal. (The ratio is more than 4 to 1.)

Bonds are said to be uniformly accurate and secure. Operation is safe, simple, and convenient. Foreseeing increasing importance in rocket and missile applications, Ryan is seeking patent protection.

• Process features: A welding electrode is applied under heavy pressure, a heavy current pulse is discharged, and pressure is continued until the weld nugget cools.

The welding apparatus, explain Ryan engineers, consists of power supply, timer, and pressure system. The timer controls the primary of the power transformer; one end of the secondary is connected to the welding electrode; the other is either grounded to the table or attached to the thicker part being welded. The timed pulse shoots about 40,000 amperes of current at 2 volts through the weld area.

The timer employed controls both power and pressure application precisely. Timing varies with the type of material being used and the kind of welding being performed.

• In addition to holding the pieces, electrode contact pressure also controls interface resistance—the firmer the contact, the lower the resistance. It is the one critical factor in the system.

Electrode pressure is adjusted to fit the factors which control interface resistance—that represents almost all of the electrical resistance in the system. Since surface finish of the parts is smooth and carefully controlled, the interface resistance remains practically constant.

Ryan engineers take advantage of the resistance factor. When welding current goes on, greatest heat buildup occurs at the point of greatest resistance—the controlled interface between parts. That is why a weld nugget forms equally in both thin and thick sections of the joint, says Ryan. Rapid quenching of foil thicknesses requires controlled followup of pressure to prevent cracking and expulsion.

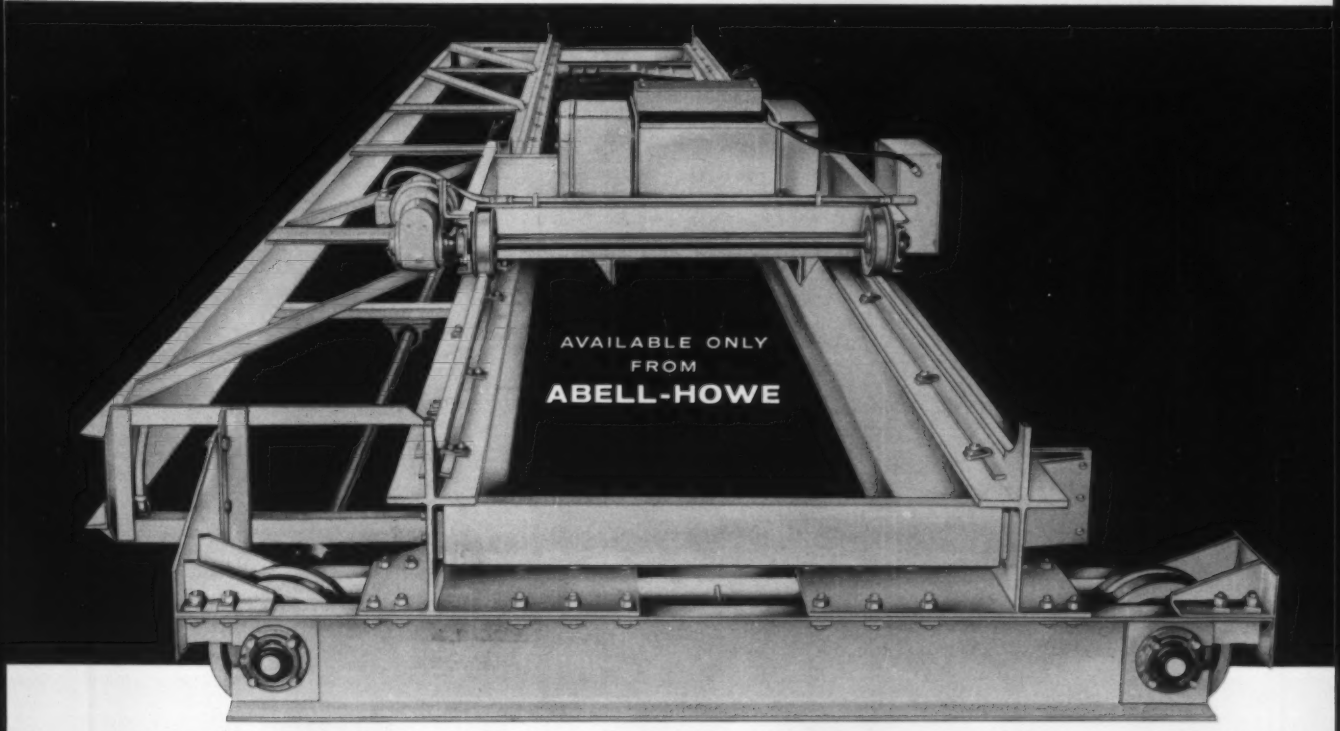
Since total heat is small and concentrated, radiation and conduction losses are minor. The weld nugget itself is small so surface distortion of metals is negligible.

• Wheel electrodes are ideally suited to the new process. Other types are used, provided pressure control is accurate.

Wheel electrodes advance along welds up to 15 ipm. At 10 welds per inch, electrode pressure at that speed is maintained long enough to avoid cavitation. Other methods which employ longer weld periods generate excessive heat. Dwell period for the electrode is thus lengthened, slowing the process.

A NEW EXPERIENCE

IN OVERHEAD HANDLING EASE AND ECONOMY



ABELL-HOWE CRANEMASTER

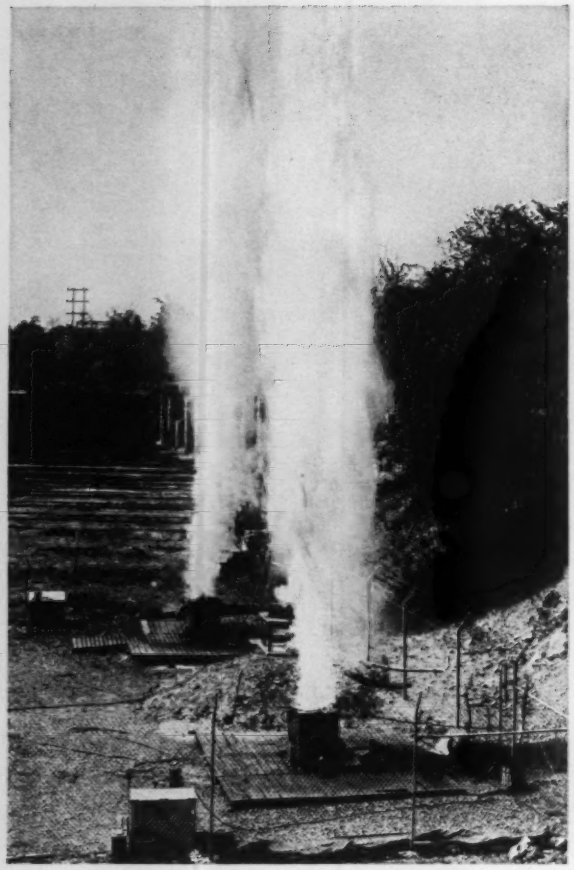
Make no mistake—this is no ordinary, run-of-the-mill crane. Here is more crane quality—more modern design per dollar than you can get in any other crane built today. Direct drive, of course . . . die forged, machined alloy steel wheels with tapered tread . . . precision ball or roller bearings plus every other feature you want.

The result is the quietest, slickest, most maneuverable crane of them all. You can actually see, hear and feel the difference.

Those men who have already selected the all-new Cranemaster agree it's a honey—the best one yet. You can read all about this new experience in overhead handling ease and economy in a new 12 page Cranemaster bulletin, ready now. Or drop us a line and we'll come calling with some interesting facts and figures.

New 12 Page Catalog tells why Cranemaster can't be beat in performance or price! Ask for Bulletin.

ABELL-HOWE COMPANY
7757 Van Buren Street • Forest Park, Ill.
Phone: EStebrook 9-6300



how Parish ingenuity reduced a forming operation to 1/1,000 of a second!

Operator removing an outer warhead shell formed and shaped by explosives.

problem: How to reduce the time and cost involved in forming large aluminum alloy missile warheads.

solution: Parish research engineers reduced the forming rate of aluminum inner and outer warhead shells to 1/1,000th of a second with explosives. A split die equipped with vacuum seals and an open top was used, with water serving as a transmitting medium for the Primacord explosive. Parish ingenuity dramatically reduced forming rates while keeping springback and work hardening to a minimum.

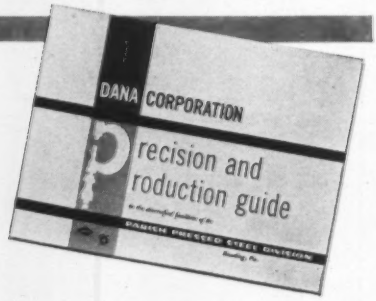
Parish facilities, skill and ingenuity have materially reduced time and cost on thousands of intricate production problems. If you have a production problem—large or small—requiring stamping, machining, forming, heat-treating, welding, balancing, forming and assembling, why not insure top-flight quality and performance by calling Parish today?

Write for your copy of this illustrated booklet describing the diversified facilities available to you at Parish.

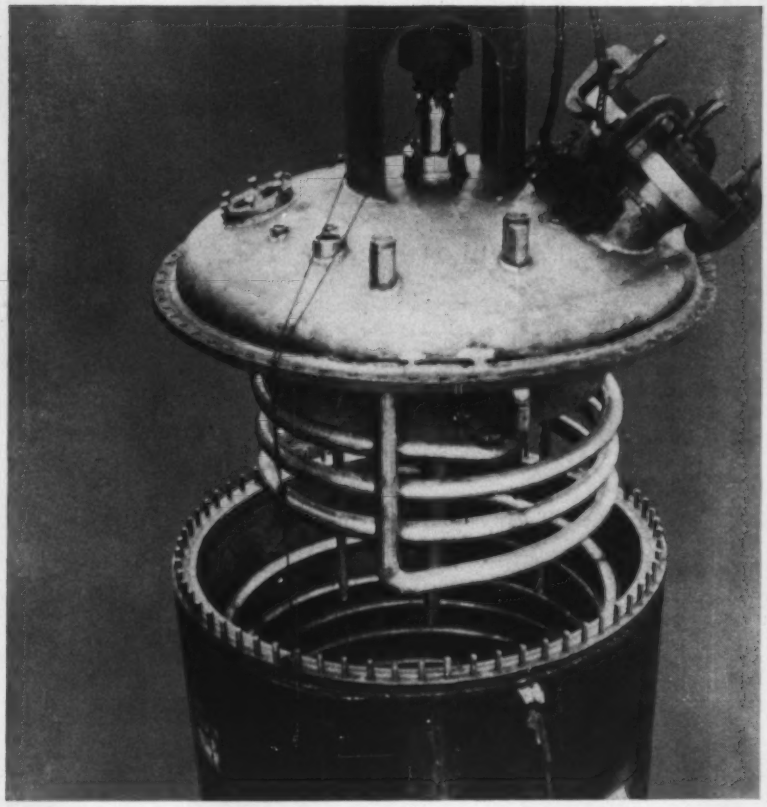
PARISH

PRESSED STEEL

DIVISION OF DANA CORPORATION • READING, PENNSYLVANIA



Stainless Reaction Kettle Ups Antibiotic Production



These coils take alternate heating and cooling and resist corrosive attack

CAREFUL CHOICE of materials used in the manufacture of processing equipment can often pay off in production increases.

Heating-cooling coils that resist thermal shocks and corrosion were an important factor in the design of an all stainless steel hydrogenator kettle used in a large pharmaceutical plant. The vessel is said to have made possible a 50 per cent increase in output of antibiotics.

The kettle, which has an operating capacity of 450 gallons, was built by J. W. Runge Co., Jersey City, N. J. Coils were made from Type 316L stainless, supplied by Alloy Tube Div., Union, N. J., of Carpenter Steel Co.

• **Unusual Design Feature** — One set of coils carries steam for heating and brine for cooling. Steam at 250° F and brine at 55° F, passing through the coils intermittently, don't damage the tubing.

Coils and internal mixing turbines withstand corrosive action of brine, steam, and materials used in the chemical process.

• **Close Tolerances Vital** — Extremely close tolerances had to be held on the mixing turbines to insure proper variable speed operation and control. Coils had to be formed accurately to provide clearance for expansion and removal for cleaning.

SIMONDS

INDUSTRIAL CUT GEARS

LARGE OR SMALL HEAT TREATED OR PLAIN

SIMONDS has over 60 years' experience in cutting quality industrial gears. We can supply any type of gear in cast or forged steel, gray iron, bronze, Meehanite, rawhide or bakelite in a full range of sizes adaptable to the material. Also heat-treated, case or flame hardened gears of carbon or alloy steel. Send us your requirements for quotation.

Custom GEAR CUTTING

SIMONDS' facilities can produce any type of custom gear from your blanks if you prefer. Same quality . . . same prompt service.

QUALITY GEARS FOR OVER 65 YEARS

SPUR GEARS
BEVEL GEARS
MITRE GEARS
WORMS
WORM GEARS
RACKS
PINIONS

Also stock carrying distributors of Ramsey Silent Chain Drives and Couplings; and industrial V-belts.

MEMBER OF AGMA

THE SIMONDS GEAR & MFG. CO.

LIBERTY at 25TH PITTSBURGH 22, PA

Get fast,

reliable delivery of the aluminum extrusions you need!

from your nearby independent fabricator...

Supplied with quality ALCAN aluminum by Aluminium Limited

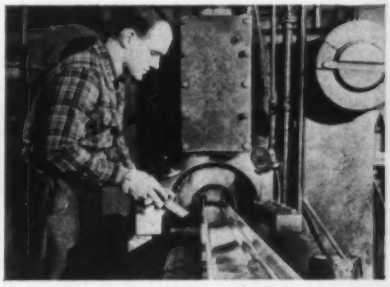
More and more, manufacturers are finding that their best source of extruded products is their nearby independent fabricator.

One reason—and an important one—is location. Because his plant is near yours, he can work closely with you in planning, pricing and engineering. He can give you convenient production scheduling . . . and assurance of on-time delivery to your plant.

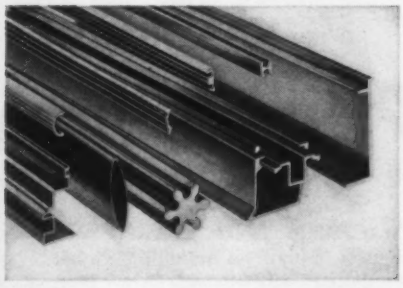
Another reason is his size . . . your business is important to him. He'll go all out to bring his many years' experience to the solution of your problems . . . to give you the quality, personalized service and unit cost that assure your repeat orders. Supplied by Aluminium Limited, your independent fabricator is backed by the research facilities of one of the world's leading aluminum producers.

Ask your aluminum extruder to estimate on your next order for semi-fabricated parts. You'll find him eager to give you the finest aluminum products at reasonable cost. Or, if you prefer, ask us to send you a list of independent aluminum extruders near your plant.

Design help. Your independent extruder is an aluminum specialist. Years of experience qualify him to help you develop the semi-fabricated aluminum shape best suited to economical fabrication.



Modern equipment. Investigate the facilities offered by your aluminum fabricator—you'll find him well equipped to serve you. His facilities, experience, location, and his personalized service make him your best source of semi-fabricated aluminum products.



Any shape . . . the right alloy. Your nearby extruder can turn out aluminum in a wide range of shapes to meet your most exacting requirements. He also works with you in choosing from a variety of aluminum alloys formulated by Aluminium Limited.

Aluminium Limited

ALCAN

In the U.S.—Aluminium Limited Sales, Inc.
630 Fifth Avenue, New York 20, N. Y.
CLEVELAND • CHICAGO • LOS ANGELES
DETROIT • ATLANTA • ST. LOUIS

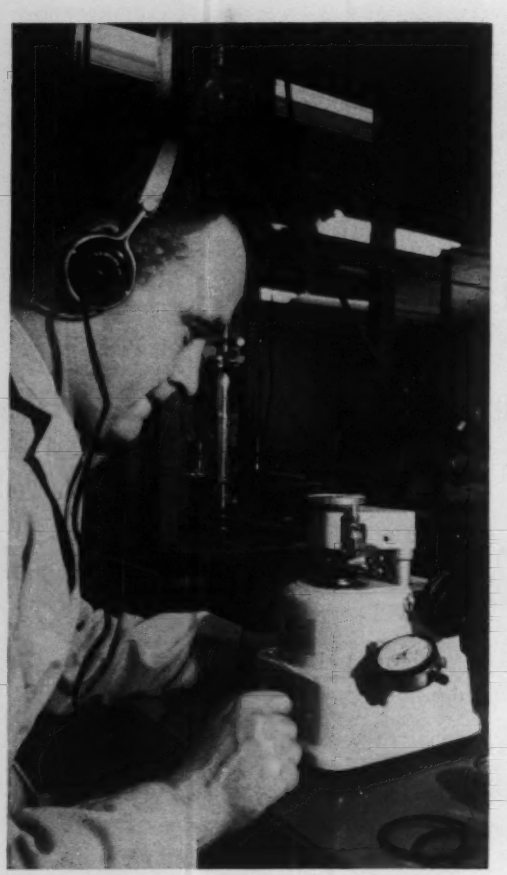
Aluminium Limited Sales, Inc., Dept. MM-3
630 Fifth Avenue, New York 20, N. Y.
Gentlemen: Kindly send me a list of independent aluminum extruders in my area.

Name_____ Title_____

Firm_____

Address_____

City_____ Zone____ State_____



Better inspection, test devices help makers. Users agree that . . .

Precision Upgrades Oil Seal Performance

MACHINE AND ENGINE designers, intent on wringing higher operating efficiencies from their products, are up against the problem of sealing lubricating systems in ever increasing temperatures and pressures.

To meet such demands, some of the newer oil seals withstand 500° F and pressures up to 100 psi, says Charles E. Dietzell, vice president, International Packings Corp., (IPC), Bristol, N. H. Example: A rubber lip seal faced with a fluorocarbon (Rulon). It can also hold a surge pressure of 1500 psi on a 60 rpm shaft.

New materials and new methods play an important part in achieving better performance, but mechanical precision, experts say, plays a key role—the flexibility of an oil seal does not offset a need for close fits.

• General Motors' research people at Detroit recently completed a three year study of seals and packings. Here are some recommendations to help you get longer life from seals, increase their efficiency, and get better bearing performance.

"Many manufacturers have been making seals for years on the premise that a good seal is a tight seal," says General Motors. "But research shows that tight seals fail prematurely and that seals must be built, checked, and applied as precision assemblies."

An oil film in a seal-shaft assembly is essential to successful operation. Even so, leaks may develop if shaft surfaces are rough, have a machining lead, have microscopic cracks, are out of round, or have too much runout. The minute helical grooves made during centerless grinding, when deep enough, carry oil under the lip seal just as the flutes in a twist drill carry chips out of a hole. Such grooves also abrade the surface like a rough surface finish.

A lot of service leaks are traced to poor shaft assembly, says GM. Burrs, nicks, and scratches are "knives" that chop lip seals and make them leakers. IPC relates a problem an automaker had with

the high warranty and replacement costs on a lip seal. Investigation showed that keyway edges on the shaft hadn't been broken properly. They were so sharp they shaved the seal into a larger diameter. Once the edges were broken properly, the problem disappeared.

• Seals often leak because manufacturing tolerances are not held. Lip diameter is especially important.

Mounting a seal too small for a shaft stretches the lip material. As the lip becomes warmer during operation, it shrinks (called the Joule effect), increasing frictional drag, elevating temperatures even more, and hastening failure.

Another detrimental reaction: Lip flutter (a repeated gripping and releasing of the shaft). Lips can suffer severe damage from heat and abrasion during such reactions.

Identical seals mounted on shafts with different surface finishes may require an adjustment of lip diameter. The reason: A shaft that is too smooth won't support an oil film at high lip pressures.

Watch tolerances on inside diameters. A series of tests at General Motors showed that it is possible to get localized lip temperatures of 350° F even when seal and bearing are completely submerged in 160° F oil. "In the past, diameter variations in production seals have been great enough to generate high temperatures or make the seal ineffective," state GM experts.

• A wide spread in rubber hardness can add to sealmaking problems.

Better measuring devices may be one answer to that problem, claims IPC. The firm employs new equipment which it claims can compare one batch of rubber with another more accurately than previous instruments it employed. O-rings (difficult shapes to test) can now be handled fairly easily, the firm states.

Another problem: Corrosion of shafts. GM researchers know that some unidentified substance in the seal is responsible, that it is most active at high humidities, and that it attacks stored new materials as well as idle in-service products. GM's possible solution: Greases that will neutralize the corrosive agent.

Parts are checked by nondestructive method as . . .

Ultrasonic Testing Setup Helps Forger Five Ways

A FLAW detection program is saving money five ways at Monroe Forgings Inc., Rochester, N. Y.

Through the use of ultrasonic equipment, the company is realizing three direct savings (it has fewer reruns, production delays, and manhour losses) and two indirect savings (by reducing extra clerical costs and additional freight charges brought about by rejects).

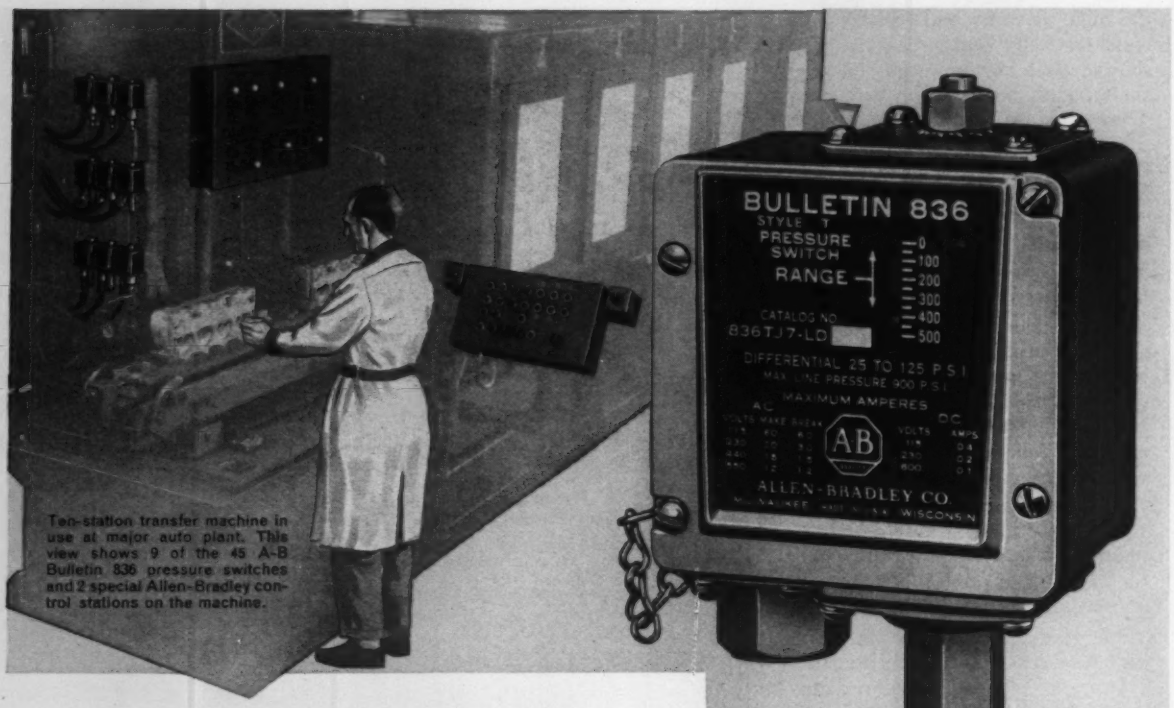
In addition, the testing equipment has increased production 20 per cent, reports Joseph Mancini, president of Monroe.

The Reflectoscope, which is portable, is also being used in a preventive maintenance program. Forging presses are checked regularly to detect structural defects.

• Testing starts with the delivery of billet stock to the plant.

Defective material is detected before it is forged. Typical materials include high speed steels, stainless steels, and superalloys.

After billets are sectioned, the company follows this procedure: An end shot is taken to locate transverse discontinuities; then a cross section is probed for longitudinal flaws. Discontinuities watched for include: Grain irregularities, nonmetallic inclusions, porosity, and flake. Acceptance or rejection is governed by order requirements. The equipment is made by Sperry Products Co., Danbury, Conn., a division of Howe Sound Co.



Ten-station transfer machine in use at major auto plant. This view shows 9 of the 45 A-B Bulletin 836 pressure switches and 2 special Allen-Bradley control stations on the machine.

ALLEN-BRADLEY

OILTIGHT

Pressure Switches

provide consistent accuracy and maximum reliability

Bulletin 836 Style T
Oiltight Pressure Switch

These rugged Allen-Bradley Bulletin 836 Style T oiltight pressure switches are specifically designed to take the punishment of hard, day-in and day-out industrial use. The die-cast aluminum housing is completely sealed. Oil cannot get in and foul the contacts—even when it flows over the enclosure in a continuous stream. The precision switch mechanism insures extreme accuracy of repeatability. An extremely important feature lies in the "snap action" of this switch—it maintains its normal contact pressure up to the instant of switchover—regardless of how slowly the trip point is approached. Contact chatter—which means unreliable operation—is impossible, and contact life is greatly increased. The contact block has two isolated circuits with one N.O. and one N.C. set of contacts.

Both the operating pressure and the differential are adjustable. The pressure is externally adjustable with the setting shown on a calibrated scale, and a trip indicator shows the operating point. These A-B *quality* controls are made for operating at pressures up to 5000 psi. Write for full details.

ALLEN-BRADLEY

Member of NEMA

QUALITY MOTOR CONTROL

Spark Machining Unit Requires Little Attention

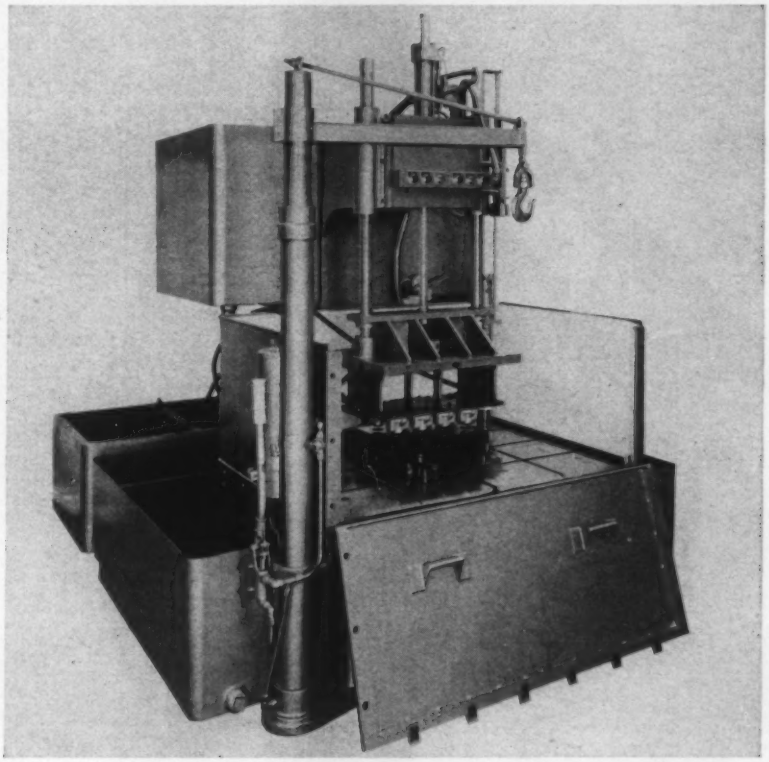
ONE MAN can attend up to four Die-Matic electrical discharge machines. Controls can be set for the complete rough cutting or precision finishing and the machine can be left to run except for the replacement of the electrode.

The unit can handle die blocks measuring 3 x 4 ft and weighing up to 6000 lb. It removes metal at the rate of 6 cu in. an hour. Ratio of metal to electrode wear in the roughing operation is maintained from 30:1 to as much as 50:1.

Building block design of the Die-Matic permits electrodes as heavy as 500 lb and as small as 0.005 in. in diameter to be run on the same machine. A compound table can be added to the platen and such accessories as rotating attachments, centering microscope, tramming device, and precision measuring equipment are available.

Standard features include a 36 x 48 in. worktable.

For further information, *write* Easco Products Inc., Ann Arbor, Mich.



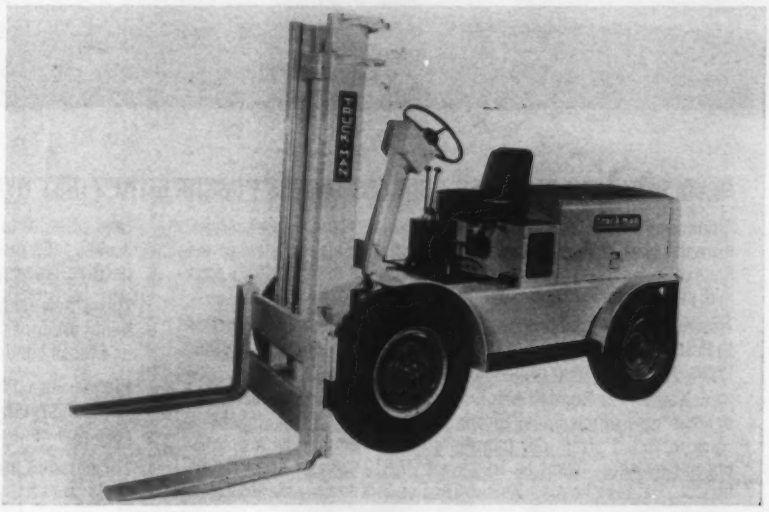
Power Steering Standard on 3 Ton Fork Truck

A PNEUMATIC tired fork truck (Y-6024) has a 3 ton capacity at 24 in. load centers. The power steering unit (standard) has no steering column, pittman arm, or drag link. Linkage has been inverted and tucked up under the truck for better protection.

Other features include a 12 volt electrical system, an exhaust system with an automotive type header pipe and large muffler to reduce back pressure and for quieter operation, and a conveniently placed instrument panel.

The frame has been narrowed by 7 in. which permits a decrease in turning radius of 28 in. Lift speeds have been increased. Free lift has

(*Please turn to Page* 138)



From Kaiser Refractories Research

A NEW FRONTIER IN BASIC BRICK!

REVOLUTIONARY PATENTED PROCESS MAKES POSSIBLE THE FIRST HYDRATION-RESISTANT TAR-BONDED BRICK

Pioneering a new brick-forming process that promises to revolutionize the manufacture of basic brick, Kaiser Refractories Research has developed, patented and proved the industry's first hydration-resistant tar-bonded brick!

This Kaiser patented process develops such increased properties that it is expected to lead the way to improvements in other types of brick to help reduce steel-making costs.

New Kaiser Tar-Bonded brick are even now helping operators achieve new efficiencies. In one oxygen steel vessel, the brick were installed after four months storage in customer's plant—did not hydrate—went on to deliver 27,812 tons of steel in 256 heats. The next lining—Kaiser Tar-Bonded again—went 30,625 tons of steel in 277 heats. And in another shop, another record broken—53 more heats than the best of the eight previous competitive linings.

These new hydration-resistant Kaiser Tar-Bonded brick are now being produced in specially designed plants at Columbiana, Ohio, and Moss Landing, California.

Pioneering cost savings and performance advances in refractories for steel is an every day job at Kaiser Refractories' two research centers.

For detailed information of these latest advances send for your copy of "A Report on Kaiser Tar-Bonded Refractories."

Use the coupon at right or contact Kaiser Refractories & Chemicals Division, Kaiser Aluminum & Chemical Sales, Inc. (Canadian subsidiary: Refractories Engineering & Supplies, Ltd.)

PITTSBURGH 22, PA. . . . . 3 GATEWAY CENTER
MEXICO, MISSOURI . . . . . MEX-R-CO BUILDING
OAKLAND 12, CALIF. . . . . 300 LAKESIDE DRIVE

KAISER REFRACTORIES

HIGH ALUMINA, FIRECLAY AND SILICA REFRACTORIES, PERICLASE BRICK, MORTARS, GRAINS AND RAMMING MIXES

KAISER REFRACTORIES & CHEMICALS DIVISION, KAISER ALUMINUM & CHEMICAL SALES, INC., 300 LAKESIDE DRIVE, OAKLAND 12, CALIFORNIA

PLEASE SEND ME "A REPORT ON KAISER TAR-BONDED REFRACTORIES."

NAME_____

COMPANY_____

ADDRESS_____

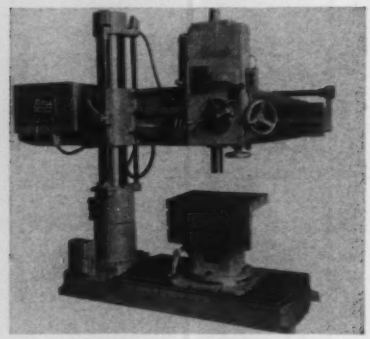
CITY_____ ZONE_____ STATE_____

(*Continued from Page* 135)
been increased varying amounts depending on the type of mast specified. Hydraulic and gasoline tanks are integral parts of the frame.

For further information, *write* Truck-Man Lift Trucks, 612 Liberty St., Jackson, Mich.

Accuracy, Easy Operation Featured on Radial Drills

THE REDESIGNED Mor-Speed radial drills provide 12 spindle speeds, six spindle feeds, and 12 in. of spindle travel. The units have centralized controls, fully enclosed elevating mechanisms with electric column clamp on 11 in. models, and roller bearing mounted heads. External electrical conduit has been eliminated and column clamp control buttons are flush mounted.



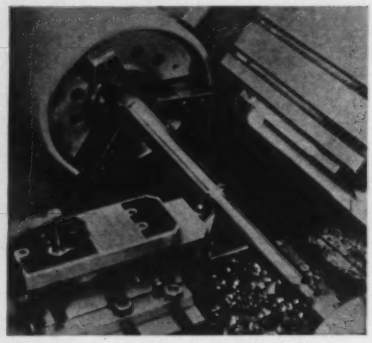
The drills are available in 9 in. column, heavy duty size with 3 and 4 ft arms; in 11 in. column, heavy duty size with 3, 4, 5 and 6 ft arms; and in 9 in. column, light duty size with 3 and 4 ft arms.

For further information, *write* Morris Machine Tool Co., 2019 Eastern Ave., Cincinnati 2, Ohio.

Machining Device Breaks Chips to Size

LONGER cutting tool life is one of the advantages claimed for a machining device that fragmentizes chips to desired size.

The unit also simplifies grooving, plunging, forming and cutoff; facilitates use and increases life of form tools; reduces tool pressure and heating; increases machine capacity; simplifies size control problems; and improves production output, the manufacturer says. The unit was designed for use with multiple or single point tools on such



machines as lathes, automatics, planers, and shapers. The device operates with a controlled, high frequency, hydraulically powered, oscillating action which maneuvers the tool cutting edge against the cut and backs it away (for clearing and cooling) many times per second. Frequency of the motion is adjustable from 25 to 200 cps.

For further information, *write* Cleveland Hobbing & Machine Co., 1311 Chardon Rd., Cleveland 17, Ohio.

Welder Does Fast Work On Light Gage Metal

CONTINUOUS voltage and slope adjustments are featured on a dc welder which is especially adapted to high speed welding on light gage metal.

The unit (Sureweld DRCP-33) provides five voltage steps with continuous selection throughout the entire range, and continuous adjustments of the volt-ampere curves.

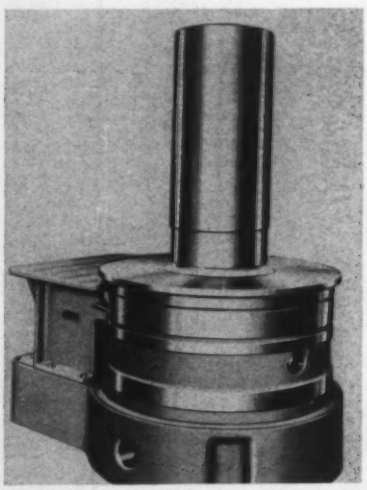
The operator is able to make slope and voltage adjustments during the weld.

It provides currents as low as 25 amperes at 14 volts and can weld alloys and other metals in the range of 0.030 in. without burnthrough or spatter at relatively high speeds. Rated welding current is 300 amperes at 100 per cent duty cycle. A 115 volt outlet provides input leads to automatic control equipment. Optional equipment is available.

For further information, *write* National Cylinder Gas Div., Chemetron Corp., 840 N. Michigan Ave., Chicago 11, Ill.

Turret Indexing Chassis Has 18 in. Center Post

AN 18 IN. DIAMETER center post has been added to a heavy duty, turret indexing chassis (Series K) to make the unit adaptable for automatic drilling, tapping, reaming,



milling, processing, and other operations where the tools lend themselves to overhead center mounting. A 3 in. diameter center hole in the post accommodates wiring and piping service to tools mounted on the stationary column. The chassis is a complete package including motor, drive, and clutch, and is intended as a basic unit in the development of special automatic machines. The chassis is available with 6 to 32 work stations and a wide variety of indexing speeds.

Extensions of the main index camshaft provide a single revolu-

tion drive for actuating operational tooling in synchronization with the main work transfer drive.

Auxiliary standard tooling includes such items as hopper pedestal mounts, memory systems, horizontal or vertical spindle milling heads, standard floor bases, pedestal mounts, and tool mounting pads.

For further information, *write* Swanson-Erie Corp., 814 E. Eighth St., Erie, Pa.

Air Compressor Doesn't Need Concrete Foundation

FROM 509 to 565 cu ft of air a minute at pressures ranging up to 125 psi is delivered by a stationary, heavy duty, air compressor.

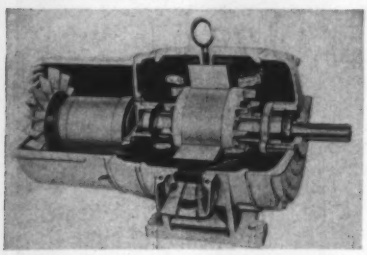
The unit (DT4) can be foot mounted on bonded rubber for semi-portable installations. It's suitable for areas where concrete foundations are impractical. A control system converts it to automatic operation. Roughing-in dimensions: 57 x 49 in. base and 46 in. height. The compressor is designed for direct drive by standard electric motor or diesel engine through flexible coupling.

For further information, *write* Atlas Copco Inc., 545 Fifth Ave., New York 17, N. Y.

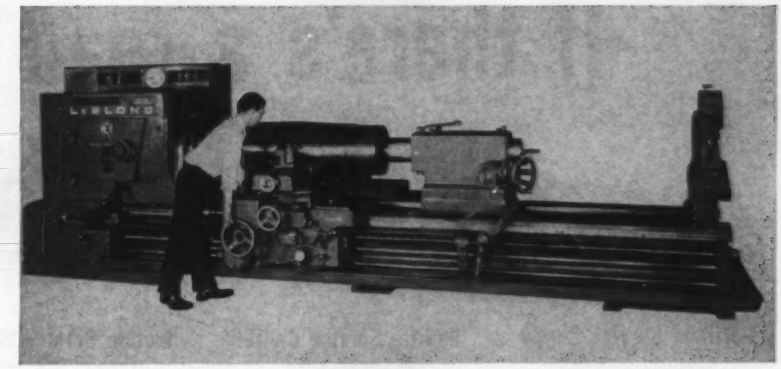
Rapid Reversing Motors Designed for Machine Tools

RAPID reversing motors for high production machine tools are available with up to 125 idle reversals per minute in the smaller sizes (with open type construction). They can be built to exceed 200 idle reversals per minute with blower cooling.

Stators are built with large, specially shaped slots for maximum copper in the windings. Rotors in the smaller sizes are cast aluminum with special slot design and low inertia construction. Larger sizes are constructed with high resistance bar rotors with many special bar and end ring alloys for optimum performance.



For further information, *write* Dept. P., Louis Allis Co., 427 E. Stewart St., Milwaukee, Wis.

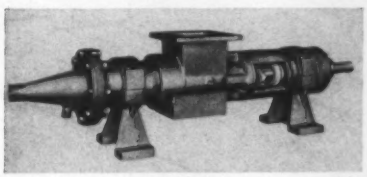


NO MANUAL GEAR SHIFTING IS NECESSARY on LeBlond NK design heavy duty lathes when equipped with speed control units. The lathes can also be equipped with remote apron control and digital readout. Digital readout atop headstock shows rpm and surface fpm. Apron control permits the operator to set cutting speed in fpm or rpm from the carriage. The control unit (called Servo-Shift) will also be available on other lathe models. For further information, **write** R. K. LeBlond Machine Tool Co., 1947 Edwards Rd., Cincinnati, Ohio

Unit Pumps Dry Powders

DRY, powdery materials can be conveyed through totally enclosed piping systems. Moyno progressing cavity pumps have been designed for that purpose.

Tests have been conducted on such things as powdered metals,



resins, silica powders, clays, starches, calcium, carbonate, talcum powders, and other dry materials. Capacities to date have ranged as high as 24,000 lb an hour.

The unit promises a neater, more efficient conveyance. Reductions in installation costs can be as high as 50 per cent, the maker says. The unit can work effectively in runs up to 200 ft or longer and is capable of vertical lifts of more than 75 ft. The principle is similar to that of a precision screw conveyor with smooth, turbulence-free performance. Small amounts of injected air are usually advised to reduce friction between powder particles. Product-to-air ratios in excess of 200:1 by weight are not uncommon.

For further information, *write* Customer Service Dept., Moyno Pump Div., Robbins & Myers Inc., Springfield, Ohio.

Two Sizes Added to Electronic Drive Series

TWO SIZES in integral horsepower ratings have been added to the line of Series 25, electronic, adjustable speed drives: Size 3 rated at a maximum of 3 hp and Size 4 at 7½ hp.

Series 25 drives use dc motors powered by two thyratrons in a full wave circuit. Speed ranges up to 100:1 are attainable. By controlling the thyratron tubes with a magnetic amplifier, the drives will hold rpm within 2 or 3 per cent of set speed under widely varying loads. Drift with time is 0.1 or 0.2 per cent of set speed after warmup, the company says. Even from a cold start, drift does not exceed 2 per cent.

All Size 3 and 4 drives include reversing and dynamic braking. Systems may be obtained with or without an enclosure and the user may

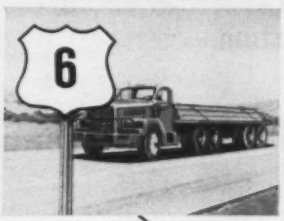
(*Please turn to Page* 142)

If there's a road near you, any steel in a hurry from

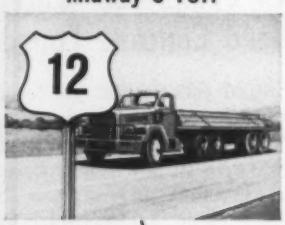
Portland Service Center
CApitol 2-3283

Seattle Service Center
MAin 3-3014

Moline Service Center
Phone 764-5616

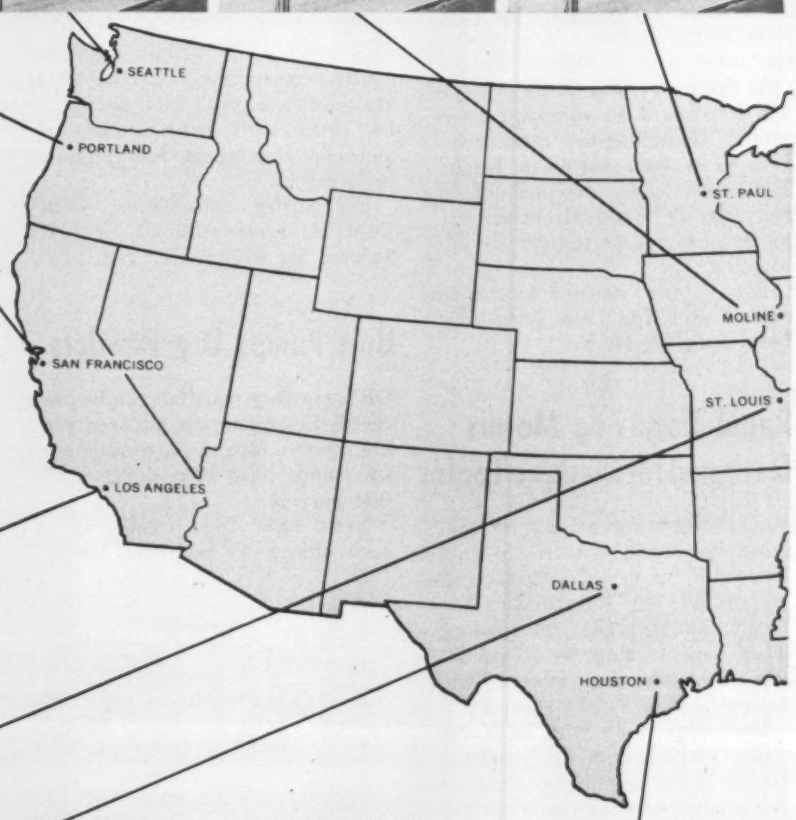


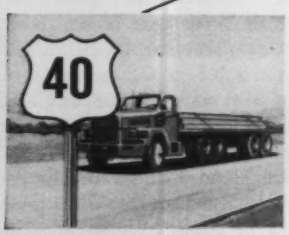
St. Paul Service Center
MIdway 6-7311



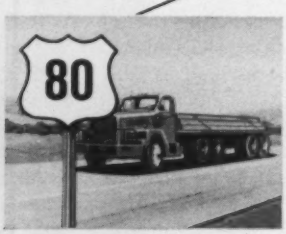
San Francisco Serv. Center
MA 1-4988 EN 1-0017

Los Angeles Service Center
LUdlow 5-0101





St. Louis Service Center
JEfferson 5-0440

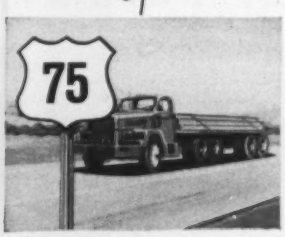


Dallas Service Center
WH 3-7356 CR 5-2747

U. S. Steel Supply
Division of
United States Steel

USS
TRADEMARK

General Office:
208 S. LaSalle St., Chicago 4, Ill.



Houston Service Center
ORchard 2-8351

you can get

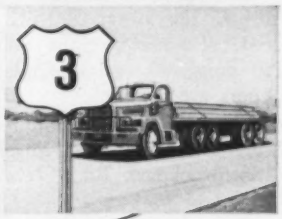
U. S. Steel Supply

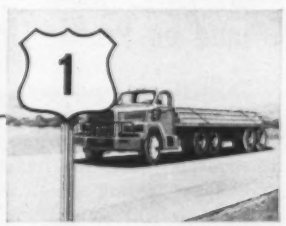
Milwaukee Service Center
Mitchell 5-7500

Chicago Service Center
Mitchell 6-3211

Cleveland Service Center
BRoadway 1-5000

Boston Service Center
STadium 2-9400

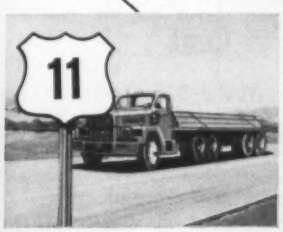




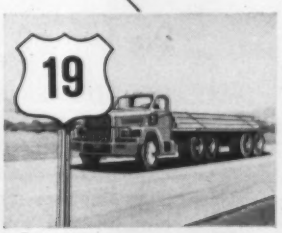
Newark Service Center
BI 2-8000 BA 7-7711

Philadelphia Serv. Center
WAlnut 5-7882

Memphis Service Center
WHitehall 8-6741



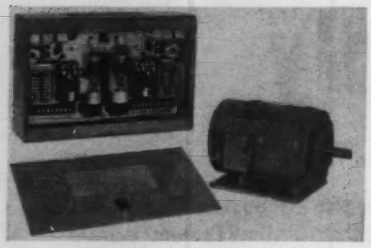
Birmingham Service Center
STate 7-9611



Pittsburgh Service Center
FAirfax 2-4200

Baltimore Service Center
VErnon 7-4900

(*Continued from Page* 139)



furnish operating controls if desired. Standard input voltage is 230 volts, 60 cycles, single phase. Others are available.

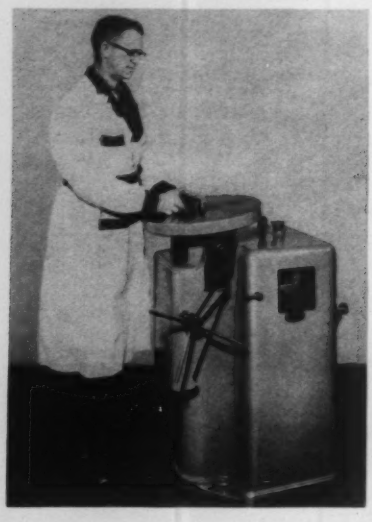
For further information, *write* Cleveland Machine Controls Inc., 1155 Brookpark Rd., Cleveland 9, Ohio.

Contours, Irregular Shapes Ground on Profile Unit

GRINDING and polishing of contours and irregular shapes on the Star No. 3 floor-type profile grinder are accurate. The unit has a tilting table. The grinding wheel is mounted on a vertical reciprocating spindle.

The wheel is in the center of a counterweighted 18 in. diameter table and is accessible from all sides. The grinding wheel has a reciprocating action that extends wheel life and prevents shoulders from forming.

The unit is designed for tool and die shops, toolrooms, and low production operations.

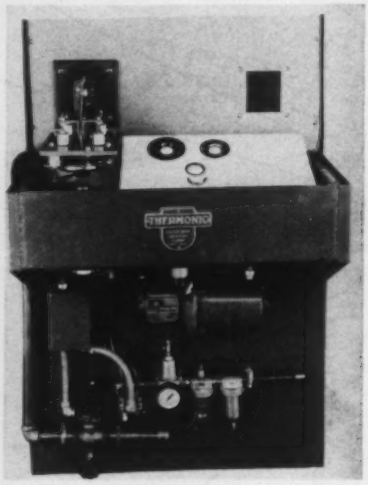


For further information, *write* Star Cutter Co., P. O. Box 376, 34500 Grand River Ave., Farmington, Mich.

Induction Heating Units Do Precision Hardening

THE FUSSY job of precision hardening bearing races can be handled by a unit that heats the working surface up to 1650° F while metal 20 thousandths of an inch away remains cool enough to produce hardening.

The company says power consumption is minimal. Only 5 kw of radio frequency energy is required for the bearing race jobs. In this



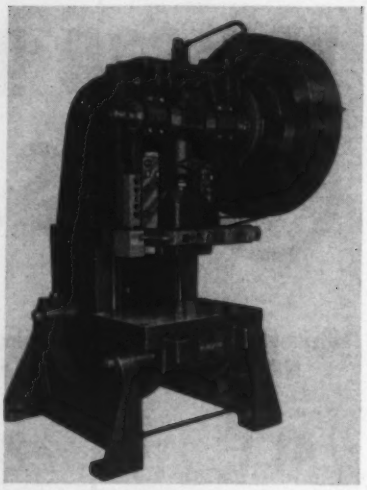
design, a special work positioning and locating fixture raises and lowers parts into the workcoil and rotates them to insure uniform heat. Surface hardness penetration can be held to less than 0.020 in.

For further information, *write* Induction Heating Corp., 183 Wythe Ave., Brooklyn, N. Y.

Press Frame Design Ups Die Life 50 Per Cent

DIE LIFE on the Model 55 press is increased up to 50 per cent by a special, high tensile, cast steel frame, says the manufacturer. It gives the ram rigidity and prevents binding and misalignment of dies during heavy blanking and drawing.

The unit is designed to handle



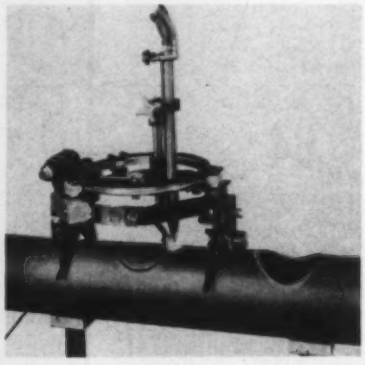
both large and small jobs easily and quickly. Other features include an Airflex air friction clutch and air-applied brake, a nonrepeat single stroke safety mechanism, and an automatic cam actuated brake for instant braking at the top of the stroke without continuous drag. The Havir automatic feed is available.

For further information, *write* Havir Mfg. Co., 444 Cleveland Ave., St. Paul, Minn.

Unit Uses Torch to Cut Holes in Pipes, Tanks

YOU CAN cut 90 degree holes in pipe, tanks, and flat plates with the Model ST hole cutter. Three sizes permit cutting perpendicular holes up to 18 in. in diameter without cams, patterns, or layouts. The lightweight machine may be used with electric drive or it may be completely hand-operated in the field.

An oxygen-acetylene torch arrangement does the cutting. Clean, burrfree edges are produced with excellent weldability, the company



reports. Little slag is accumulated and grinding is not necessary.

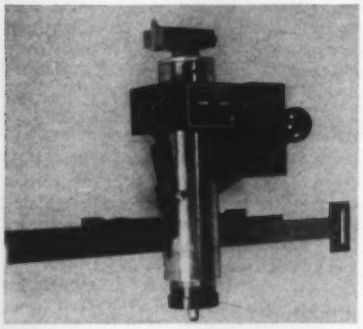
The machine is powered through its cycle by a variable speed electric motor. When hand operated, cutting speed is controlled by the operator.

For further information, *write* Steffan Mfg. Corp., 1585 S. Lincoln Ave., Salem, Ohio.

Copying Lathe Attachment Turns Contours, Radiuses

A COPYING lathe attachment made by Turnomat turns a variety of contours, radiuses, tapers, and 90 degree reverse shoulders in unlimited lengths and diameters (including face turning).

The unit can be mounted on the tool post of engine lathes, screw machines, and boring mills. The tool is mechanically actuated and will copy from template in tolerances of



0.0005 in. or better in one pass with zero precision in concentricity, the company says. An unskilled operator can handle more than one machine.

For further information, *write* Turnomat Co. Inc., Brockport, N. Y.

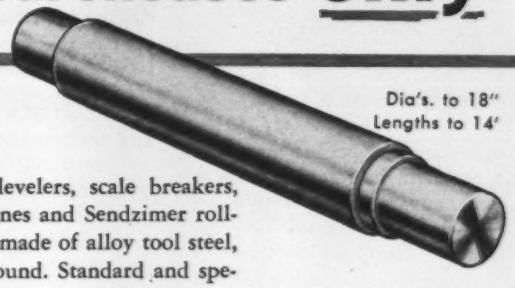
Square Frame Reduces Size of Large Motors

A NEARLY square frame on the Duty Master D-5000 motor provides better cooling and permits using a smaller over-all dimension for a horsepower rating. The unit is available from 125 through 300 hp with sleeve or ball bearings.

Class B insulation is standard on the Duty Master and frames and end louvers are cast iron. The louvers (removable for inspection

For STEEL MILLS

and warehouses *only*



"HILL ACME" ROLLS

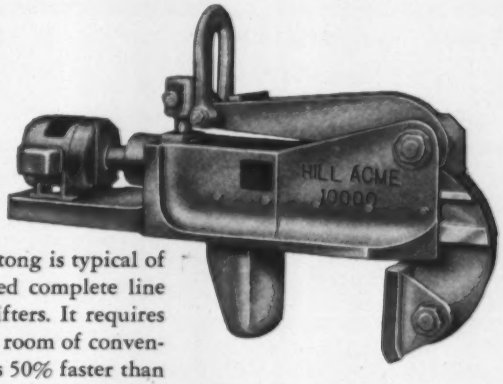
Dia's. to 18"
Lengths to 14'

Custom made for levelers, scale breakers, straightening machines and Sendzimer rolling mills. Precision made of alloy tool steel, heat treated and ground. Standard and special types.

"CLEVELAND" METAL CUTTING KNIVES

The product of forty years of experience in manufacturing alloy grade, metal cutting knives of all types for shearing hot and cold metals.

"HILL ACME" MOTORIZED LIFTERS



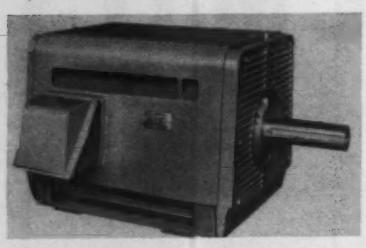
This vertical coil tong is typical of the newly designed complete line of HILL ACME lifters. It requires only 1/3 the head room of conventional tongs and is 50% faster than mechanical types. Gives a constant grip ratio regardless of wall thickness and can be prepositioned to eliminate damage to the coil. Available up to 80,000 lbs. capacity. Contact us for "C" hooks, Rack Lifters, Billet, Sheet, Plate, Bar, Ingot and Ingot Mould Lifters.

THE HILL ACME COMPANY

1201 West 65th Street • Cleveland 2, Ohio

MANUFACTURERS OF: "HILL" Grinding and Polishing Machines • "ACME" Forging Machines • "CANTON" Rotary and Alligator Shears • BAR-BILLET Shears MATERIAL HANDLING Equipment • "CLEVELAND" Knives and Shear Blades.

NEW PRODUCTS and equipment



and maintenance) permit air to be drawn through the rotor and stator. The company says this results in more efficient cooling and greater horsepower. Dripproof enclosure is standard; splashproof enclosures can be specified. In addition, encapsulated stators are available for severe conditions.

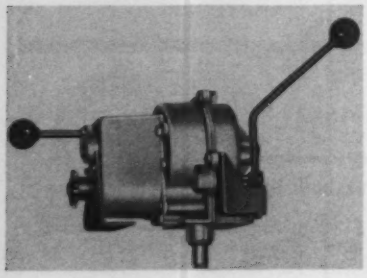
You can get units for 220, 440, or 550 line voltages for 3600, 1800, 1200, and 900 rpm operation. The company says a totally enclosed, fan cooled design will be available soon. Horsepowers up to 2000 will be ready early in 1962.

For further information, *write* Reliance Electric & Engineering Co., 24701 Euclid Ave., Cleveland 17, Ohio.

Two Speed Transmission Handles Up to 5½ hp

A RIGHT angle, reversing transmission with two forward speeds, reverse, and neutral is primarily designed for vertical engines with capacities up to 5½ hp. Reduction in high speed is 2:1 and 3.4:1 in low. Maximum recommended input speed is 1800 rpm. Forward, neutral, and reverse are controlled by the shifter lever in the right angle half of the transmission.

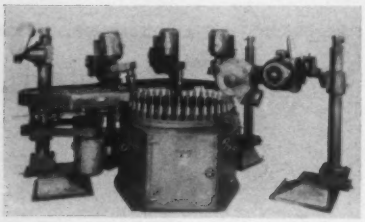
The unit weighs about 14 lb. It can be mounted in any position. The company claims the unit is leakproof even under extreme operating conditions.



For further information, *write* J. B. Foote Foundry Co., P. O. Box 2214 Ft. Dearborn Station, Dearborn, Mich.

Rotary Finishing Unit Has Index, Continuous Drives

AN AUTOMATIC rotary polishing and buffing machine can be easily converted in less than 1 minute from rotary indexing to continuous rotary motion or back again to permit finishing operations on a variety of parts.



The unit is set up to handle such parts as door handles, metal drinking tumblers, flashlight cases, engine valves, coffee pots, plumbing fixtures, and diecast parts. The manufacturer cites three advantages for combining both index and continuous drives in one unit: 1. Reduction in floor space requirements. 2. Lower capital investment. 3. Increased machine utilization.

For further information, *write* Acme Mfg. Co., 1400 E. Nine Mile Rd., Detroit 20, Mich.

Ductile Matrix Abrasive Breaks Down More Slowly

A DUCTILE, matrix abrasive called New Controlled T outlasts its predecessor by 40 per cent, says National Metal Abrasive Co. The new formulation is said to extend the service life of blast machinery equipment and improve production speeds. The material breaks down more slowly and continues to clean efficiently far longer.

The abrasive carries an increased austenite content and has a Rockwell C rating of 50 to 60.

For further information, *write* National Metal Abrasive Co., 3560 Norton Ave., Cleveland 11, Ohio.

NEW Literature

Write directly to the company for a copy

Conveyor Systems

"How to Plan and Install Your Own Conveying System" is the subject of a handy guide, Bulletin No. 500. A-B Farquhar Div., Conveyor Systems Inc., 6451 Main St., Morton Grove, Ill.

Structural Tubing

A buyers' and designers' guide, technical bulletin 12-3, provides engineering data on square, rectangular, and round steel tubing for structural applications in the construction of buildings, machinery, furniture, fixtures, appliances, truck bodies, racks, and supports. Joseph T. Ryerson & Son Inc., Box 8000-A, Chicago 80, Ill.

Commercial Rivets

A 12 page booklet contains specifications for Cherry Commercial Rivets in plugged (structural) and hollow (nonstructural) types available in aluminum, mild steel, and Monel. A series of charts, drawings, and photographs covers such topics as how to choose the right rivet for the job, recommendations on drill hole size, material thickness guide and an application tool guide covering three powered and three hand-actuated rivet setting guns. Cherry Rivet Div., Townsend Co., Santa Ana, Calif.

Table of Plastics Properties

A table shows the significant physical, electrical, chemical, and optical properties of nine thermoplastic materials. Materials covered are acrylics, acetate, butyrate, Teflon and Kel-F fluorocarbons, nylon, polyethylene and vinyls. Data are compiled from test reports submitted by manufacturers. Cadillac Plastic & Chemical Co., 15111 Second Ave., Detroit 3, Mich.

Arcwelding Stainless Steel

Bulletin 7300.2 gives physical properties, structure, and welding characteristics of the different types of stainless steels. It also has a chart listing deposit properties and electrode recommendation tables for the different types. Lincoln Electric Co., Cleveland 17, Ohio.

Single Spindle Chuckers

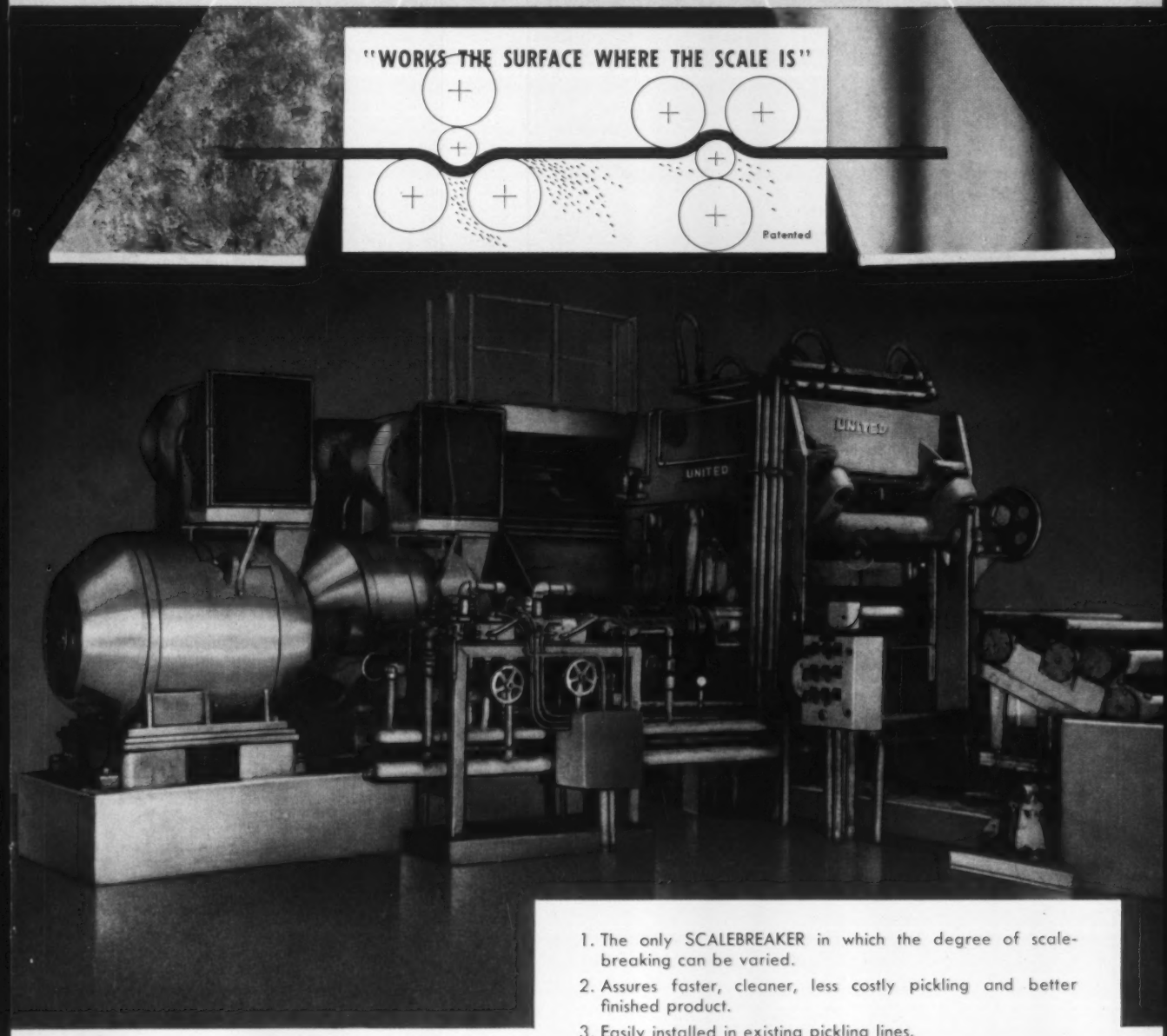
Machining jobs on 1AC, 2AC, and 3AC chucking automatics are described in a 32 page booklet. Information on workpieces, tooling, machine functions, setup, and methods is presented. Warner & Swasey Co., 5701 Carnegie Ave., Cleveland 3, Ohio.

Beryllium Copper Strip

A 12 page bulletin (No. S-1100-A) describes the advantages of using beryllium copper, gives physical and mechanical properties, and tells how to select the right beryllium copper alloy to meet specifications. Dept. 12, Beryllium Corp., P. O. Box 1462, Reading, Pa.

UNITED®

Strip Processing
SCALEBREAKER



1. The only SCALEBREAKER in which the degree of scale-breaking can be varied.
2. Assures faster, cleaner, less costly pickling and better finished product.
3. Easily installed in existing pickling lines.

Write today for complete engineering data.

UNITED ENGINEERING AND FOUNDRY COMPANY

PITTSBURGH, PENNSYLVANIA

Plants at: Pittsburgh • Vandergrift • Youngstown • Canton • Wilmington

Subsidiaries: Adamson United Company, Akron, Ohio
Stedman Foundry and Machine Company, Inc., Aurora, Indiana

Designers and Builders of Ferrous and Nonferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Processing Equipment, Presses and other heavy machinery. Manufacturers of Iron, Nodular Iron and Steel Castings and Weldments.

RED CIRCLE SERVICE

EVERY FACILITY IS YOURS TO SPEED SPOT ORDERS

Acme-Newport Steel

Red Circle Service for your rush orders means preferential handling from steel melting to finished processing. Your specifications are followed implicitly, with fast delivery as your bonus. This is possible through unique flexibility in scheduling and our personnel's cooperation and understanding of the urgency. When gaps appear in your coil or sheet inventory make sure you take advantage of this added feature. Specify Acme-Newport *Red Circle Service.*

Acme-Newport Steel COMPANY

NEWPORT, KENTUCKY

A SUBSIDIARY OF ACME STEEL COMPANY

PRODUCTS OF ACME-NEWPORT STEEL

Hot Rolled Steel in Coil	Cold Rolled Steel in Coil (*full hard only*)	Plates (5/16" *and lighter*)
Hot Rolled Pickled Steel in Coil	Cold Rolled Sheets	Electrical Sheets
Hot Rolled Sheets	Alloy Sheets and Plates	Electric Weld Line Pipe
Hot Rolled Pickled Sheets		Spiral Welded Pipe

Outlook Brighter for March

LOOK FOR A 10 per cent increase in steel production and shipments in March even if automakers don't step up their buying.

The upturn is inevitable for two reasons: 1. Inventory liquidation is tapering off. 2. Steel consumption is trending upward seasonally. Ingot output will be close to 7 million tons (vs. 6.2 million in February). With a little help from the automotive industry, production may exceed 7 million tons for the first time since last June.

PRODUCTION RISING—Even now, steelmaking is on the upswing. Some mills are reacting to a pickup in orders while others, seeing no immediate improvement, are preparing for better business in the weeks ahead by increasing their inventories of semifinished material. To get their share of an expanding market, they'll have to compete on a speed-of-delivery basis. A stainless producer made that clear when he remarked: "Jobbers want to know in 3 or 4 hours whether they can get steel in two to four days. Four days was wonderful service until some mills decided that two to four days sounded more attractive. Now they're promising two days—period."

Ingot production in the week ended Mar. 4 will probably be close to the 1,590,000 tons that STEEL estimates the industry produced in the week ended Feb. 25. (Output in the week ended Feb. 18 was 1,582,000 tons.) STEEL predicts that first quarter production will be 19.6 million tons—up 4 per cent from the 18.9 million tons made in last year's fourth quarter.

SIGNS OF STRENGTH—The outlook in the Chicago area is improving, despite continued cutbacks in automotive tonnage. Tin plate and galvanized sheets are riding seasonal uptrends. Farm equipment manufacturers are stepping up their orders as they increase production. In the East, producers of hot rolled and cold rolled sheets are getting more orders from furniture, conduit, and appliance manufacturers. One of the nation's largest steelmakers revealed on Feb. 20 that its sales for the month (all products) had already passed the volume of business that it booked in all of January.

"LITTLE GUYS" BUYING—At another big mill, disappointment over February bookings that were no better than January's brought this comment from a marketing official: "The mantle of optimism is beginning to feel kind of itchy." But on a positive note, he added: "We're hearing from a lot of people we haven't heard from in a long time. The number of items being ordered is increasing even if aggregate tonnage isn't. The little guys are coming into the market, and that may mean that inventory reduction has run its course. In March, we're hoping to see the increase in tonnage that we've been expecting for such a long time."

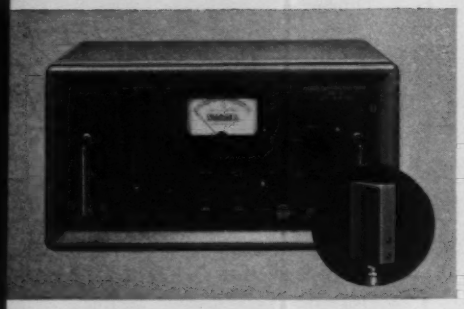
OUTLOOK FOR EXPORTS—Final figures for 1960 show that the U. S. had a foreign trade deficit in steel products last year of 375,000 tons. In dollars, we came out ahead because the products we exported (chiefly tin plate, cold rolled sheets, and specialties) cost more per ton than the items we brought in (mostly bars, wire rods, and wire products). Our exports of 2.98 million tons were worth $601 million; imports of 3.35 million tons were valued at $449 million. This year, market analysts predict that our exports will equal or exceed imports. Some say we'll have a favorable balance of 600,000 tons, but few expect our mills to ship as much steel overseas as they did in 1960. Reason: European automakers aren't expected to turn out as many cars as they did last year, so they won't need such big tonnages of cold rolled sheets.

WHERE TO FIND MARKETS & PRICES

	News	Prices
Bars, Merchant	153	160
Reinforcing	153	161
Boiler Tubes	...	165
Canada	...	168
Charts:		
Finished Steel	...	159
Ingot Rate	158	...
Scrap Prices	...	171
Clad Steel	...	166
Coal Chemicals	...	168
Coke	155	168
Comparisons	...	159
Contracts Placed	177	...
Contracts Pend.	177	...
Electrodes	...	168
Fasteners	...	165
Ferroalloys	...	169
Fluorspar	...	168
Footnotes	...	165
Imported Steel	151	168
Ingot Production	158	...
Metal Powder	...	168
Misch Metal	155	...
Nonferrous Met.	174	176

	News	Prices
Ores	...	168
Pig Iron	155	167
Piling	...	160
Plates	153	160
Plating Material	...	177
Prestressed Strand	...	165
Price Indexes	...	159
Producers' Key	161	...
R.R. Materials	177	165
Refractories	...	168
Scrap	171	172
Semifinished	...	160
Service Centers	155	167
Sheets	152	161
Silicon Steel	...	162
Stainless Steel	155	166
Strip	152	162
Structurals	177	160
Tin Mill Prod.	152	162
Tool Steel	153	166
Tubular Goods	155	166
Wire	152	162

NEW ADVANCEMENTS ON THE METAL FORMING FRONT



ELECTRONIC PRESS LOAD MONITOR ACTUATES SIGNAL OR DISENGAGES CLUTCH WHEN OVERLOAD OCCURS

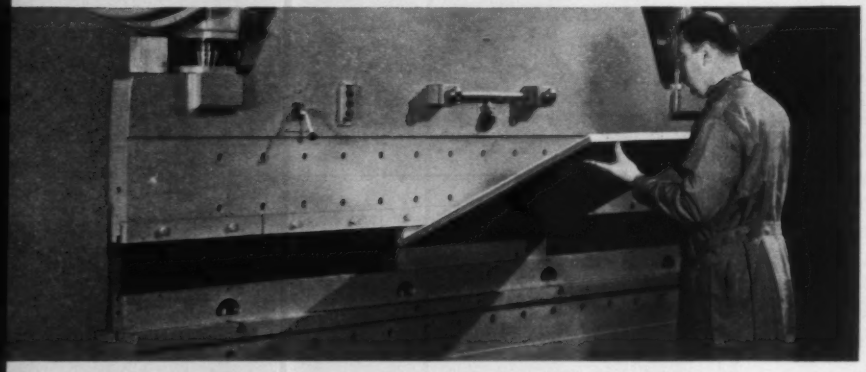
Niagara's new Press Load Monitor, an electronic precision instrument, continuously measures and visually indicates all loads on a press during die setup or production. When a preselected press load is reached, a tripping circuit disengages the clutch to prevent overload repeats, or actuates a warning signal. Consisting of 2 or 4 pickups mounted permanently to press frames or tie rods, and a control unit located near the press, Load Monitor instantly indicates press loads from 0 to 140% of press capacity regardless of press speed. Key-locked controls prevent tampering by unauthorized personnel. Request *Product Report No. 2.*

PORTABLE ELECTRONIC TONMETER MEASURES LOADS TO SAFEGUARD DIES AND PRESSES

The Niagara Portable Transistorized Tonmeter is an accurate, fast-response instrument for measuring loads imposed on a press or battery of presses during production or die setup. Pickups placed on press frames sense the intensity of loads. Large indicator, reading in percentage of press capacity, shows the maximum load during the press cycle. Because battery-powered unit requires no electrical outlet and is easy to carry, one individual can check several presses in minutes. Unit is designed to prove its calibration and test its own battery to be sure operating power is within prescribed limits. Request *Product Report No. 2.*

SLIDING BOLSTER PRESSES SLASH DIE CHANGEOVER TIME

Niagara presses arranged with Sliding Bolsters save hours of setup time on work requiring frequent die changes. On inclinables, straight sides, or other Niagara presses, sliding bolsters permit die removal or replacement in minutes instead of hours. Floating on a "cushion of air," dies can be easily moved into and out of work area by hand. Optional features for the slide may include power or manual die clamps, power or manual slide adjustment, shut height position indicator, semi-automatic slide positioner. Request *Product Report No. 1.*



AUTOMATIC STROKE CONTROLS PREVENT PRESS BRAKE "WHIP-UP"

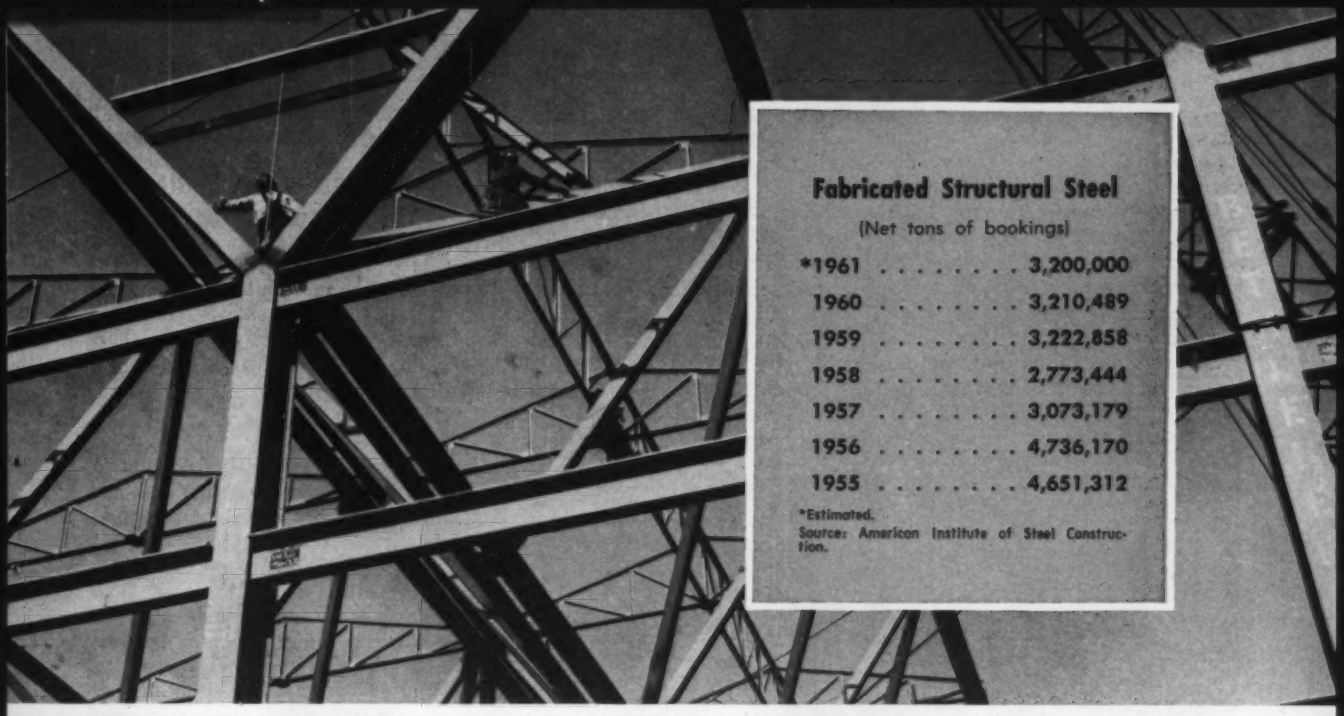
Two automatic stroke control systems recently developed by Niagara are making new press brake efficiency and operating safety a reality.

The first, an Alternating 2-Speed Stroke Control, for press brakes with air clutches, increases production by providing a positive means of avoiding "whip-up" and "back bending" during high speed operations involving wide sheets. Following a fast approach, ram speed is automatically reduced during the working portion of the stroke, then automatically increased for a fast return to top of stroke. Because slipping the clutch is no longer necessary, less operator skill and experience are required. Clutch burnouts are prevented. Work spoilage resulting from back bends is eliminated. Selector switch offers choice of three stroke-speed combinations. Request *Product Report No. 3.*

The second, an Automatic Ram Arrestor, is available for both air and mechanical clutch machines. Following a fast approach, ram is automatically *stopped* at a predetermined point just before it touches the work. Ram can then be "inched" through the bending portion of the stroke, avoiding whip-up and back bending. It may then be returned to top of stroke at high speed. Since inching is confined to such a small portion of the stroke, operating cycle is faster... operator fatigue and clutch wear are reduced. Even inexperienced operators can perform safely and efficiently with minimum work spoilage. A single adjustment permits the stopping point to be matched to die and material. Request *Product Report No. 3.*

NIAGARA

NIAGARA MACHINE & TOOL WORKS
683 Northland Avenue, Buffalo 11, N. Y.



Fabricated Structural Steel

(Net tons of bookings)

*1961	3,200,000
1960	3,210,489
1959	3,222,858
1958	2,773,444
1957	3,073,179
1956	4,736,170
1955	4,651,312

*Estimated.
Source: American Institute of Steel Construction.

Constructional Steel Outlook Good

ORDERS for fabricated structural steel in 1961 should hit the 3.2 million ton mark for the third consecutive year, predicts L. Abbett Post, executive vice president, American Institute of Steel Construction. Others think the total may run a little higher.

Mr. Post also believes that there will be an increase in the number of structures built "because the new ASTM A 36 steel and plastic design result in 10 to 15 per cent savings in weight."

He adds: "Construction of commercial and public buildings will increase and offset a drop in industrial buildings. Tonnage for highway bridges will equal the 1960 rate, but more lineal feet will be built as A 36 gains acceptance.

"Shipments will be down in 1961, but the year should end on a rising trend," he believes.

Fabricators generally believe that construction will get off to a relatively slow start. Some improvement should come in the spring, but the main activity is expected in the second half, thus reversing the trend of a year ago.

• A U. S. Steel Corp. spokesman predicts that shipments may increase in 1961, making it the best year since 1957.

He looks for continued improvement throughout the year in commercial and highway work.

"The normal seasonal pickup holds promise for the first half," he believes, "and it is likely that some inventory replacement in the second half will result in shipments exceeding consumption. It is apparent there was a net reduction in structural inventories during 1960."

• Over-all construction activity, including housing and all construction categories, maintenance, and repair, will run ahead of last year's.

The Associated General Contractors of America forecasts the new construction put in place will amount to $76,775,000,000 against $74,100,000,000 last year and $75,533,000,000 in 1959.

Principal reasons given by AGC for the more favorable outlook:

• Needs for all kinds of physical facilities remain large.

• There should be a considerable pickup in residential construction, both private and public, due to population growth, the sharp lag in residential construction last year, and the new administration's commitment to sponsor legislation that will expand such construction.

• Easing of credit conditions in recent months may stimulate construction—housing in particular.

• The new administration and new Congress will take the necessary steps to put the long range highway program back on schedule after last year's curtailment.

• The record amount of public bond issue proposals approved in 1960 will lead to an expansion of public works. Some of the impact will be felt this year.

• Increasing competition from other materials and imports is intensifying structural engineering and research activities. Results are encouraging.

New economies were opened up with the adoption of A 36—its specified minimum yield point is 38,000 psi vs. 33,000 psi for A 7; other gains have been realized in fasten-

ers, especially high strength bolts; and new welding techniques.

Standards requiring closer dimensional tolerances than those of ordinary structural framing have stimulated demand for exposed structural steel as a medium of architectural expression. And standards for open web steel joists have been refined.

Sponsored research is going on at many universities. (Lehigh, for example, is working on plastic design, with particular emphasis on its application to multistory buildings.)

Promotion and market research activities are being stepped up. There is an increasing drive for light work, such as homes and churches, where, fabricators say, costs, speed of erection, permanency, and uniqueness of design often weigh in their favor.

• Structural steel rolling capacity has risen from 5 million to 8 million tons in the last ten years.

Capacity is always running ahead of demand. Structural fabricators have also added a lot of capacity—they, too, have overcapacity now. There has been a growing trend toward diversification. Some fabricators, particularly on the West Coast, handle reinforcing bars as well as structural shapes. However, it is estimated that no more than a third of the structural shops are diversifying in any important degree.

• Prestressed concrete is proving to be a formidable competitor in some lines, especially in bridge construction.

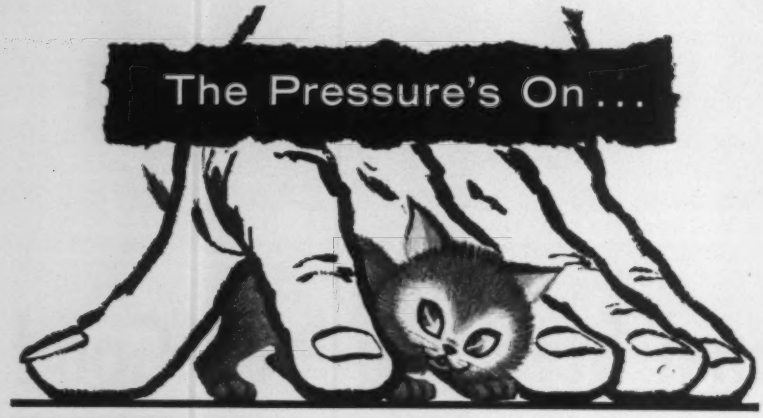
About 230 plants in the U. S. (representing about 185 companies) manufacture prestressed concrete products. About 165 are affiliated with the Prestressed Concrete Institute, Chicago. Canada has about 20 plants, representing 15 companies. Some are also members of the institute.

Structural imports are providing competition along the Eastern and Western seaboards and Gulf Coast, but, in general, inroads do not reach too far inland. Duane T. Molthop, president, Vierling Steel Works, Chicago, regards foreign steel as a "minor factor with most Midwestern fabricators because of the uniformity of domestic material and the continued research and improvement being made by rolling mills in the U. S."

But Mr. Molthop points to an "ever increasing competition with other products—concrete and timber."

He looks for "increased demand for fabricated structural steel in the months ahead. Architects and engineers have a normal amount of work on their boards and are anticipating a pickup."

R. L. Mullen, president, Lehigh Structural Steel Co., Allentown, Pa., stresses the effect of foreign competition in transmission towerwork and certain other types of galvanized construction involving light structural members that can be bundled and easily handled for ocean shipment. Italy has been an active competitor in this field. The competition, he says, is also reflected in the world markets. Exportation of towerwork from the U. S. has dropped noticeably over recent years.



with Sof-Loc* HYDRAULIC HOLDDOWN SYSTEM

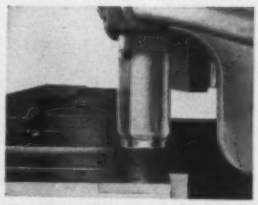
...GENTLE but POSITIVE

...exclusive on Lodge & Shipley POWER SQUARING SHEARS

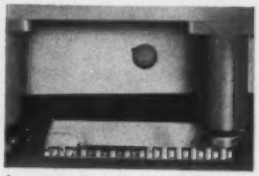
Tons of pressure, but applied so gently and quickly... using air for speed, oil for pressure... that's the secret of the exclusive Lodge & Shipley Sof-Loc Holddown. Quietly, without damage to easily marred surfaces, it gives unequalled holding power for fast, "dead accurate" shearing of light sheets or heavy plates.

Sof-Loc is but one of a combination of features you need but won't find on any other shear. These features and the advantages they give are described in a new 20-page catalog of Lodge & Shipley Shears: capacities from 10 gauge to ⅜" for heavy duty and high production shearing.

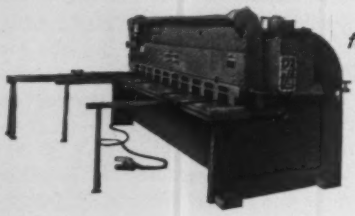
Request Bulletin S-347 from: The Lodge & Shipley Co., 3070 Colerain Ave., Cincinnati 25, Ohio.



Holddown fingers are individually adjustable and removable.



Impact eliminated, so is damage to easily-marred material.



for shear excellence, choose...

Lodge & Shipley

*PATENTED, TRADEMARK REGISTERED

Export Prices Lowered on Some Heavy Steel Items

Reductions of 25 to 37 cents per 100 pounds in export prices on some heavy steel products were made effective Feb. 18 by U. S. Steel Products Co., a subsidiary of U. S. Steel Corp. The action, reportedly taken to meet competition from other domestic interests, is the first change in open market export prices since early in 1959 when some adjustments were made to reflect freight rate revisions.

Under the new schedule, standard structural shapes, C.B. sections, and bearing piles are quoted down 25 cents per 100 pounds to $5.73, f.a.s. vessel at New York, Philadelphia, and Baltimore. Plates are now quoted $5.38, down 37 cents. These prices are above those quoted in the domestic market.

1960 Steel Exports Rise But Fall Below Imports

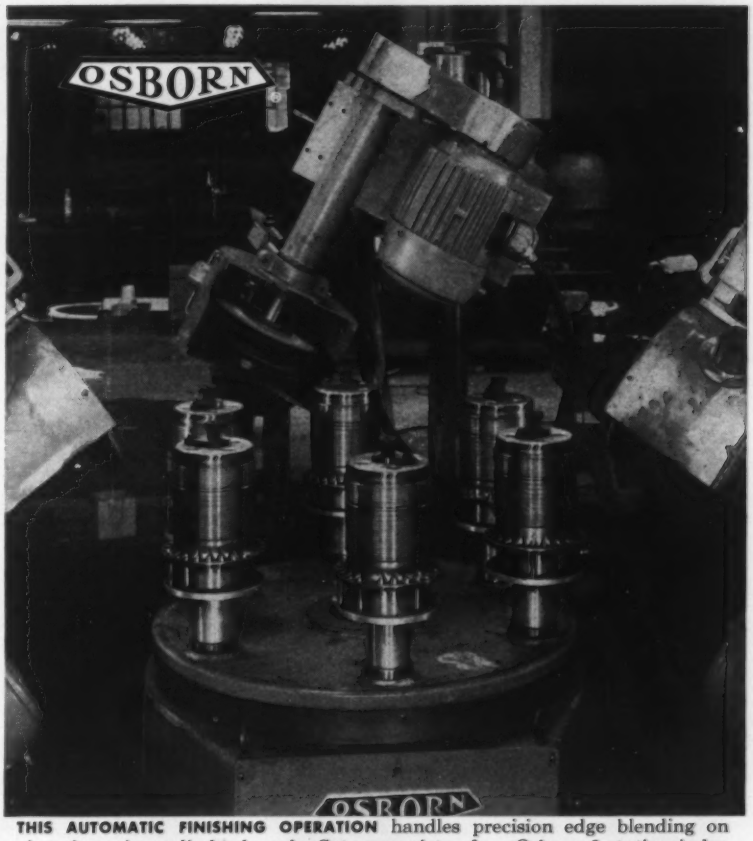
Steel imports exceeded exports on a tonnage basis last year, but, dollarwise, exports topped imports, reports the U. S. Department of Commerce. Exports of steel mill products totaled 2,979,000 net tons valued at $600,783,000, while imports amounted to 3,354,000 tons valued at $448,820,000.

Export volume exceeded that of 1959 when the steel strike held the outgoing movement to 1,676,000 tons valued at $363,278,000. Imports that year totaled 4,392,000 tons valued at $515,440,000.

Both exports and imports in December, 1960, were down from the preceding month. Exports amounted to 162,000 tons vs. 234,000 in November, 1960, and 130,000 in December, 1959. Imports in the month totaled 189,000 tons against 199,000 in the preceding month and 539,000 in December, 1959.

Principal steel product imports last year were: Concrete reinforcing bars, steel pipe and tubing, wire rods, sheets and strip, steel bars, and structurals. Belgium and Luxembourg were the principal supplying countries, followed by West Germany, Japan, France, the United Kingdom, and Canada.

Principal steel exports were: Sheets and strip, tin mill products,



THIS AUTOMATIC FINISHING OPERATION handles precision edge blending on aircraft engine cylinder barrels. Setup consists of an Osborn 6-station index table and three finishing heads equipped with Osborn Fascut® Brushes with deburring compound. Heads No. 1 and 3 each brush one minute clockwise and ccw to put .020" blend on edges of mounting holes. Head No. 2 brushes 1½ minutes cw and ccw to put .010" blend on top edge and O.D. thread ends.

EDGE BLENDING cylinders

done 566% faster with OSBORN power brushing

Here's an aircraft manufacturer with a problem: specifications for these reciprocating engine cylinder barrels called for precision tolerances. Hand finishing rate: 3 parts an hour . . . too slow . . . too costly.

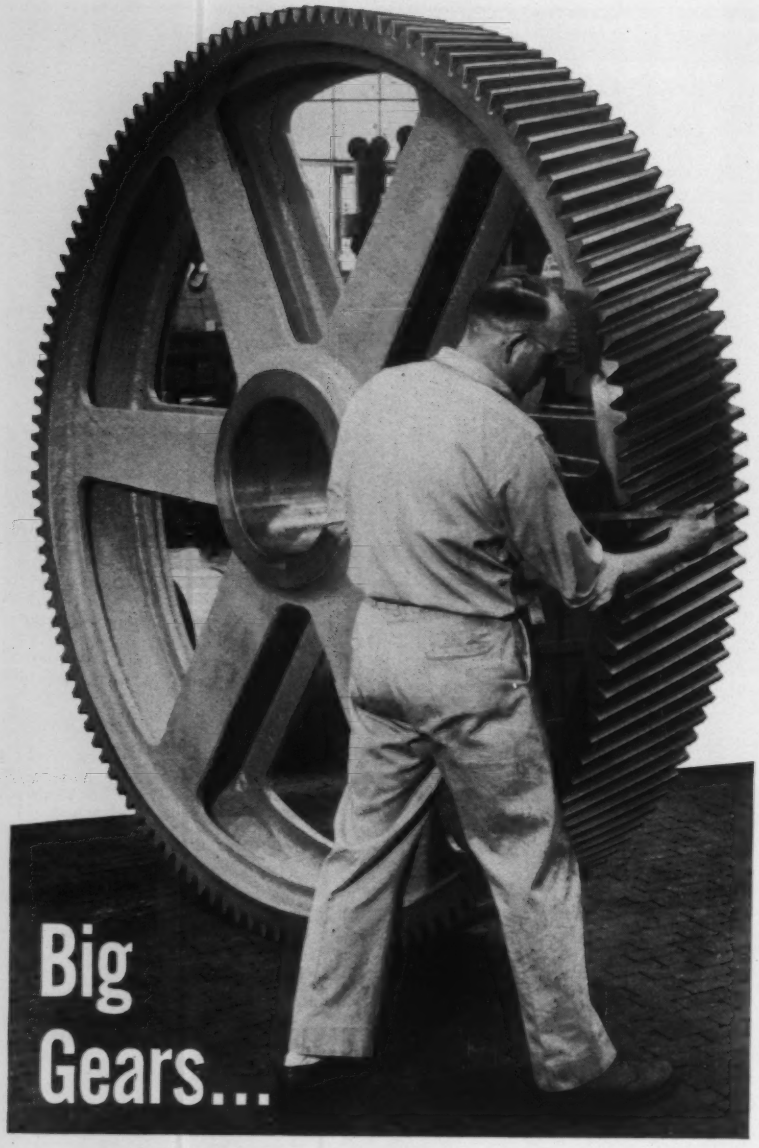
Today, an automatic Osborn Metal Finishing Machine handles the work . . . *power brushing* the parts rapidly, uniformly, economically. Rate: 20 an hour . . . *566% faster with exceptional quality control.*

It's another case-in-point of today's Osborn power brushes and brushing methods at work throughout industry solving tough metal finishing problems. An **O**sborn **B**rushing **A**nalysis—made in your plant now at no obligation—can cut costs on *your* deburring, cleaning, polishing and precision blending operations. Write or call *The Osborn Manufacturing Company, Dept. S-32, Cleveland 14, Ohio. Phone ENdicott 1-1900.*

OSBORN

Metal Finishing Machines . . . and Finishing Methods

Power, Paint and Maintenance Brushes • Foundry Production Machinery



fast delivery on custom requirements

SPUR • HERRINGBONE • HELICAL

Horsburgh & Scott specializes in fast production of quality industrial gearing . . .

Gears engineered to meet custom requirements in a wide range, from small to large sizes.

Speed Reducers produced in standard types and special drives for fast custom delivery.

Send your specifications, or let our technical staff make recommendations.

Write for Catalog FLB-60

The HORSBURGH & SCOTT CO.

5112 Hamilton Avenue • Cleveland 14, Ohio

Manufacturers of Gears and Speed Reducers for over 75 years

structurals, and steel pipe and tubing. Principal customers were Canada and the United Kingdom.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 161 & 162

Despite the lag in automotive buying, producers of hot and cold rolled sheets are stepping up operations a little. That's particularly true of cold rolled—modest, but diversified, demand for it is developing.

More sheet tonnage is going into furniture, tubing, and conduit; and household appliance needs are a shade heavier. Appliance needs, in limited degree, are stimulating orders for low silicon electrical sheets and enameling stock, as well as hot and cold rolled material. Galvanized sheets are moving more freely to distributors, who are anticipating a seasonal pickup in agricultural requirements.

Tin Plate . . .

Tin Plate Prices, Page 162

Canners are calling for more tin plate. However, a substantial portion of the tonnage is being drawn from mill stocks, so such demand is not reflected in increased production. A spurt in rollings is anticipated late next month and in early April. Over-all market prospects are promising. One leading tin plate producer predicts that business this year will exceed 1960's.

Wire . . .

Wire Prices, Pages 162 & 165

Wire order bookings are diversified, but aggregate volume is only slightly improved. Producers are having difficulty building backlogs to sustain production schedules. While demand for manufacturers' wire in general is slightly more active, the spring grades (and most of the wire specialties) continue to move slowly.

Automotive requirements are a lot slower than had been anticipated. Rod demand is sluggish, and foreign steel (noticeably higher carbon grades) is a competitive factor in the market. An Eastern screw manufacturer is reported operating almost exclusively on imported wire rods.

Northwestern Steel & Wire Co., Sterling, Ill., reports that since Jan.

31 it has experienced a seasonal increase in demand for its products and a corresponding improvement in its level of shipments.

Standard Stock Sizes of Tool Steel Cut Sharply

The number of standard stock sizes of tool steel is being reduced by the tool steel stock industry, reports the Commodity Standards Division, Office of Technical Services, Business & Defense Services Administration, U. S. Department of Commerce. The new list of sizes is given in Simplified Practice Recommendation R264-61, Oil Hardenable Flat Ground Tool Steel Stock. It becomes effective Mar. 16, and has been endorsed by numerous producers, distributors, and users.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 161

Government pump priming is expected to stimulate construction activities, with resulting increased pressure for shipments of reinforcing bars and other forms of building steel. There are indications that states will push considerable work forward, especially jobs that are financed in whole or in part with federal funds.

Steel Bars . . .

Bar Prices, Page 160

Although January sales of cold finished steel bars were 10 per cent above the average for the three preceding months, there's no evidence of a sustained uptrend in demand. The January spurt resulted mainly from orders that were deferred from late December, when buyers were concerned about keeping yearend inventories as low as possible.

February bookings dropped back to the September-October level, forcing producers to operate at half capacity. The outlook for March is clouded, but seasonal factors alone will probably boost shipments by 10 per cent.

Plates . . .

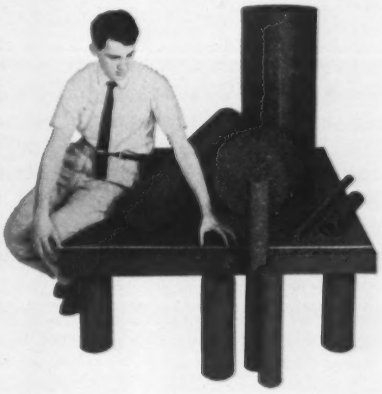
Plate Prices, Page 160

Plate fabricating shops are buying steel largely against firm commitments, replacing plate stocks as

NEW MASSIVE MC NYLON PLATE NOW AVAILABLE!

• Huge MC Nylon plate—the largest ever produced—is now available for wear plates, panels, tooling, fixtures and other applications which need nylon's unique mechanical or structural properties.

Polymer's exclusive revolutionary new processing techniques make production of large plate practical with price reductions of 15% under nylon plate presently available. Standard stock availabilities now include thicknesses from ½" up to 4" and in 2' by 4' sections. Availabilities to date were limited to 1½" maximum thickness in 10" widths. MC Nylon now opens new design possibilities and manufacturing economies. On special order plates of over 6" thickness in sections of 4 foot widths and 10 foot lengths can be supplied.



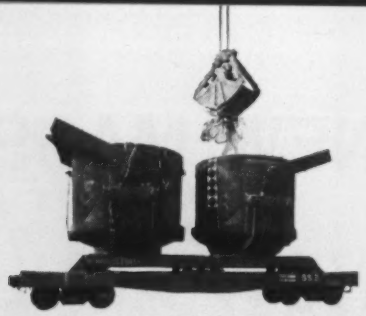
In tubular bars, the specially formulated bearing material now costs less than continuous cast bronze bushings of similar size, with prices up to 50% below other nylons.

MC Nylon tubular bars are made in OD's from 2" to 15" with wall thicknesses of ⅜", ½", ¾" and 1". Rod up to 17" diameter is also available with special larger sizes and shapes made to order. Supplied in Polypenco blue.

Call or write for full information.

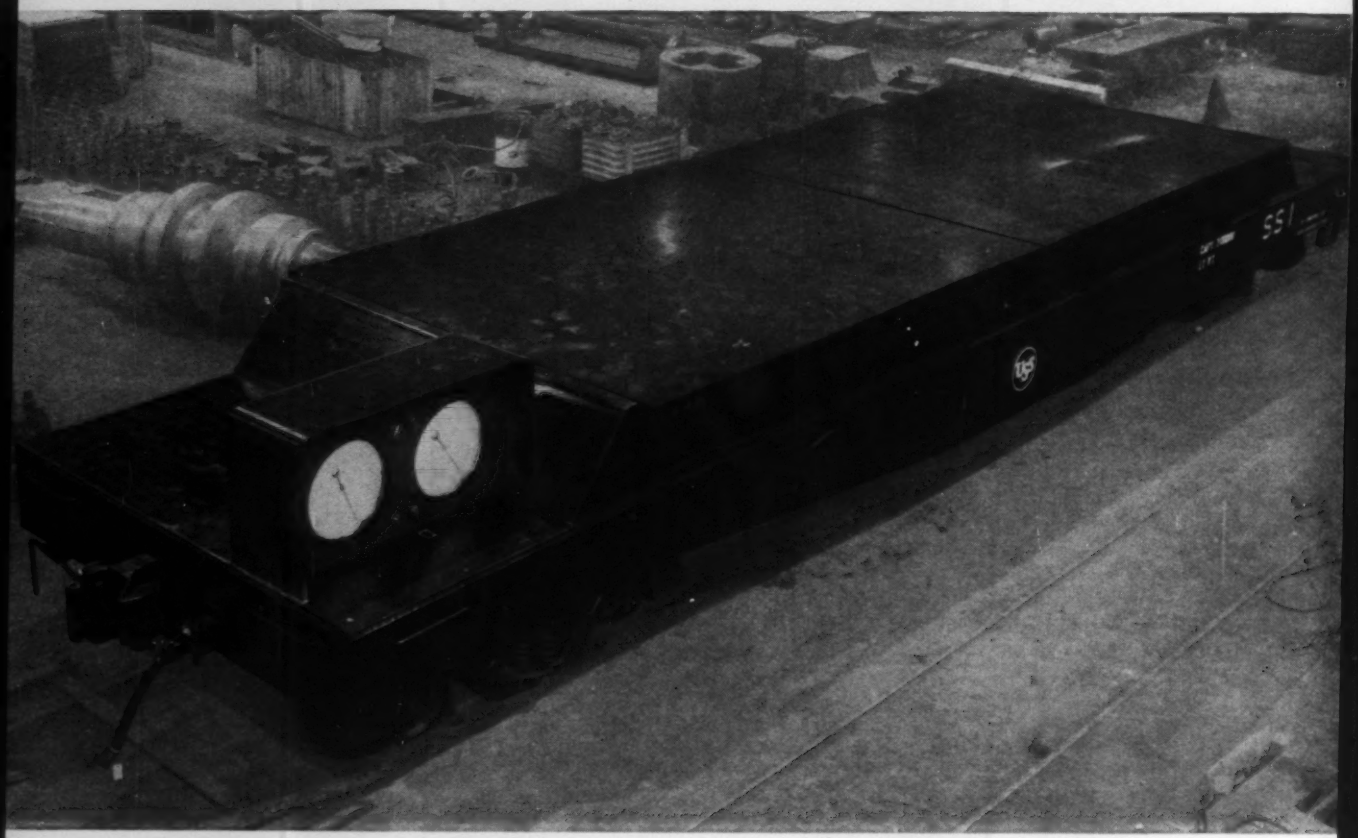
POLYPENCO® *industrial plastics*

The Polymer Corporation of Pennsylvania
Reading, Pa.
Export Polypenco, Inc., Reading, Pa., U.S.A.



This mark tells you a product is made of modern, dependable Steel.

this car is a traveling all-purpose weigh platform



At McLouth Steel, stainless scrap is loaded and weighed to within two-tenths of one percent accuracy. This double operation, performed right in the yard, cuts handling time in the mill and gives them better control of charging mixtures.

Weigh anything up to 100 tons, anywhere on the track, with this new, all-purpose weigh car. It can handle one 100-ton load or two 50-ton loads to within two-tenths of one percent accuracy. You can use it anywhere because the load cells are hydraulically operated and need no power. A weigh car pays for itself by eliminating guesswork and human error.

The McLouth Steel Corporation, Detroit, Michigan, uses this weigh car to predetermine the exact weight of stainless steel scrap and other expensive alloying ingredients. They cut handling time because weighing is done right in the yard. Weight records give them better control of inventory and charging mixtures and make it easier to find the yield cost. Other steel producers cut costs by weighing electric furnace charges and products to control yields. This all-welded, stress-relieved steel car will stand up in all of these uses and give long, dependable service.

USS Weigh Cars and other industrial cars are built to last by United States Steel, a company that also *uses* them! We can custom design and build any type weigh car to best suit your needs. Send your weight problems to United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania. United States Steel Corporation, Pittsburgh · Columbia-Geneva Steel, San Francisco · Tennessee Coal & Iron, Fairfield, Alabama · United States Steel Export Company

USS TRADEMARK

United States Steel

they move out of storage. In the East, except for shipyard needs, fabricators are estimating little head tonnage. A substantial volume of ship requirements for alloy steel is reported, notably for the Portsmouth (N. H.) Navy Yard.

Weldment shops are estimating subnormal tonnage, and are placing orders for plates sparingly, with deliveries ranging two to four weeks on carbon and alloy material.

Stainless Output in 1960 Falls Short of 1959 Mark

Production of stainless and heat resisting steel ingots in the fourth quarter of 1960 totaled 206,470 net tons, bringing output for the year to 1,000,763 tons, reports the American Iron & Steel Institute.

Comparable data for the fourth quarter of 1959 are not available. However, output for the last six months of 1960 was 403,577 tons vs. 387,029 in the same period of 1959. Output for all of 1959 was 1,126,793 net tons.

The breakdown of production by types in 1960 and 1959 follows:

Production of Stainless And Heat Resisting Steel Ingots

(Net tons)

Type Number	1960	1959
201	14,966	15,355
202	8,269	12,815
301	51,356	56,580
302	104,629	143,049
302B	.....	447
303	21,562	34,232
303Se	1,037	1,211
304	223,095	214,042
304L	24,421	22,511
305	4,599	6,740
308	2,791	4,015
309	4,744	5,962
309S	1,819	1,871
310	4,826	5,742
310S	1,446	1,272
316	45,297	44,594
316L	17,629	14,481
317	805	972
321	18,099	27,256
347	9,710	10,608
Other chromium-nickel	46,080	55,127
Total	608,180	678,882
403	9,454	9,622
405	2,727	2,306
406	1,609	1,915
410	32,603	33,360
416	17,431	25,516
416Se	.....	472
420	4,078	5,779
430	212,111	245,494
430F	2,372	3,202
431	1,865	3,053
440A	2,107	1,386
440B	.....	2,221
440C	2,033	2,712
442	695	1,206
446	1,385	2,328
All other	19,446	8,686
Totals	309,916	349,258
501-502 and all other high chromium heat-resisting steels	10,862	13,532
Totals, all types shown	928,958	1,041,672
Production not reported by type	17,805	85,121
Total Production	1,000,763	1,126,793

Price Cut on Misch Metal Is Announced by Ronson

A general price decrease on all forms of CerAlloy misch metal was announced last week by the Cerium Metals & Alloys Div., Ronson Metals Corp., Newark, N. J. The new schedule for ingots: 2000 lb and up, $2.70 per pound; 500 to 2000 lb, $2.80; less than 500 lb, $2.90.

Other forms, such as cast pellets, donuts, and extruded pellets are available on a comparable basis. Current price levels represent a sharp reduction from the 1955 price of $4.50 per pound and the $3.50 per pound that prevailed as recently as 1958.

Tubular Goods . . .

Tubular Goods Prices, Page 166

Construction of natural gas pipe lines in Western Canada is benefiting three Canadian mills which are sharing orders for 80,000 tons of 36 in. pipe required for 500 miles of line.

Recent price advances on foreign pipe kept some of the tonnage from going to European producers, it was reported.

American Cast Iron Pipe Co., Birmingham, has obtained a 25,000 ton order for larger diameter, cast iron, pressure pipe as part of a $62,750,000 water improvement program for Oklahoma City, Okla. The order was placed by Okatoka Constructors, a combination of national contractors. It calls for 20 miles of 30, 36, 42, and 48 in. pipe.

Controlling interest in Anniston Foundry Co., Anniston, Ala., a producer of cast iron pipe has been acquired by Woodward Iron Co.

Distributors . . .

Prices, Page 167

Operators of steel service centers report a mild improvement in orders. But bookings this month probably won't exceed January's because of fewer working days. March, they believe, should be the best month this quarter.

Part of the improvement in demand is attributed to the low level of most user inventories. They are down to where replacements are becoming more of a day-to-day necessity.

Pig Iron . . .

Pig Iron Prices, Page 167

Small improvement is noted in merchant iron demand. On a daily basis, there has been little change since the beginning of the year, and bookings are considerably smaller than they were a year ago. March, with its greater number of working days, may prove to be the best month in the first quarter.

Most foundries are operating on reduced schedules and are awaiting improvement in orders from the automotive, railway equipment, and machine tool fields. In some districts, including Los Angeles, melters are pouring about 10 per cent more than they did at the start of the year, but the volume is still considerably down from last year's.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 168

Semet-Solvay Div., Allied Chemical Corp., will build a battery of 60 byproduct coke ovens at its Baylor Road plant in Buffalo. Dismantling one of two existing batteries will begin early in March.

(*Please turn to Page* 158)

QUANTITY PRODUCTION OF GREY IRON CASTINGS

ONE OF THE NATION'S LARGEST AND MOST MODERN PRODUCTION FOUNDRIES

ESTABLISHED 1866

THE WHELAND COMPANY

CHATTANOOGA 2, TENN.

New... from VAN HUFFEL

COLD FORMED CONTINUOUS

SINGLE WELD

STEEL TUBING IN RECTANGLES AND SQUARES IN SIZES THIS

BIG

FOR INDUSTRIAL AND ARCHITECTURAL APPLICATIONS

Steel

WHERE **BIG** IDEAS TAKE SHAPE IN METAL

APPLICATIONS

Because of its high production potential and adaptability, the uses of Van Huffel square and rectangular tubing are practically unlimited. Here are a few:

- Structural Columns
- Sign Supports
- Canopy Supports
- Beams
- Steel Buildings
- Farm Equipment
- Earth Moving Equipment
- Bridge Work
- Automobile Transports
- Storage Racks
- Guard Rails

ACTUAL SIZE
6" x 6" .259 WALL

ADVANTAGES

MORE STRENGTH
Roller Die, cold formed continuous welding *on one side ONLY* provides maximum strength throughout.

GREATER SAVINGS
High strength-to-weight ratio permits use of lighter gauges or smaller sizes than solid metals.

UNIFORMITY
Uniform wall thickness, square sides, accurate radii and straightness.

FUNCTIONAL BEAUTY
Smooth finish, free of scale and protruding flash, ready to paint.

STANDARD SIZES AND GAUGES

Squares:
5" x 5" — .165" to .259 wall
6" x 6" — .165" to .259 wall

Rectangles:
4" x 6" — .165" to .259 wall
4" x 8" — .165" to .259 wall

in any lengths and all common grades of steel.

ACTUAL SIZE: 4" x 8" .259 WALL

Van Huffel also produces this wide range of standard welded sizes and gauges:

ROUND: ⅜" thru 6" in gauges from .020 (25 ga.) thru .259 (3 ga.) and all intermediate sizes.

SQUARE: ⅜" thru 6" in gauges from .020 (25 ga.) thru .259 (3 ga.) and all intermediate sizes.

RECTANGULAR: ⅜" x ⅜" thru 4" x 8" in gauges from .020 (25 ga.) thru .259 (3 ga.) and all intermediate sizes.

All Van Huffel Welded Tubing stocks are available through Steel service centers in principal cities.

WRITE FOR FREE
48 page handbook

VAN HUFFEL
TUBE CORPORATION • WARREN, OHIO

(*Concluded from Page* 155)

The new battery is expected to be completed by the end of this year.

Industrial Paint Price Up

Prices on industrial paint products have been advanced 3 per cent by the Glidden Co., Cleveland. The increase is attributed to higher costs of wages, raw materials, containers, transportation, and other items.

Steel Ingot Output Rises To New High Since June

STEEL estimates a further gain of 0.5 per cent in ingot production for the week ended Feb. 25. Output is at the highest level since last June and is expected to hold close to the current weekly output of about 1,590,000 tons the next few weeks. No marked improvement is expected until mid-March or later.

- **Pittsburgh** — Producers are expected to hold operating schedules close to 75 per cent of the average weekly rate in the 1957-59 period. STEEL forecasts any marked improvement will come after the middle of March.
- **St. Louis** — Steelmaking operations in this district are distinctive in that they are ranked the highest of any in the country on the basis of comparison with the average weekly output in the 1957-59 period.
- **Birmingham** — Steel production here in the week ended Feb. 25 is estimated by STEEL at 90,500 tons.
- **Buffalo**—Production here is holding steady. There is no indication that mills plan to increase schedules within the next few weeks.
- **Youngstown**—Production is holding steady but is expected to drop later this month when Youngstown Sheet & Tube Co. suspends operations at its Campbell (Ohio) Works for a changeover of some facilities.
- **Detroit**—STEEL estimates a drop in output here during the week ended Feb. 25 as one mill cuts back its furnace operations.
- **Philadelphia** — Ingot output is edging upward from the week ended Feb. 18 when production increased 4 points to 84 per cent of the 1957-59 weekly average.
- **Cleveland**—Steel output in this area has been averaging between 67,000 and 71,000 tons weekly the last month or so. No significant change is in prospect.
- **Chicago** — Production increased about 4500 tons during the week ended Feb. 25, based on STEEL estimates.

Steel Ingot Production — January, 1961

Period	Open Hearth (Net tons)	Bessemer (Net tons)	Basic Oxygen Process (Net tons)	Electric (b) (Net tons)	Totals (Net tons)	Index (a)
1961						
January†	5,540,000	50,000	213,000	621,000	6,424,000	77.9
1960						
January	10,510,616	211,132	280,981	1,046,675	12,049,404	146.1
February ...	9,715,527	216,263	245,458	949,558	11,126,806	144.2
March	10,103,122	202,812	306,741	952,008	11,564,683	140.2
1st Quarter ...	30,329,265	630,207	833,180	2,948,241	34,740,893	143.4
April	8,603,306	105,336	302,763	766,452	9,777,857	122.5
May	7,844,140	73,010	309,505	603,817	8,830,472	107.0
June	6,441,594	80,344	314,766	568,169	7,404,873	92.7
2nd Quarter ...	22,889,040	258,690	927,034	1,938,438	26,013,202	107.4
1st Half	53,218,305	888,897	1,760,214	4,886,679	60,754,095	125.4
July	5,494,331	61,700	289,003	505,890	6,350,924	77.0
August	5,860,394	52,652	279,550	645,404	6,838,000	82.9
September ..	5,525,244	42,228	287,323	603,626	6,458,421	80.9
3rd Quarter ...	16,879,969	156,580	855,876	1,754,920	19,647,345	80.2
Nine Months ..	70,098,274	1,045,477	2,616,090	6,641,599	80,401,440	110.3
October	5,917,780	56,914	270,450	623,236	6,868,380	83.3
November ...	5,308,894	51,246	257,286	554,514	6,171,940	77.3
December ...	5,042,558	35,559	202,330	559,394	5,839,841	70.8
4th Quarter ...	16,269,232	143,719	730,066	1,737,144	18,880,161	77.1
2nd Half	33,149,201	300,299	1,585,942	3,492,064	38,527,506	78.7
Totals (1960) .	86,367,506	1,189,196	3,346,156	8,378,743	99,281,601	101.9

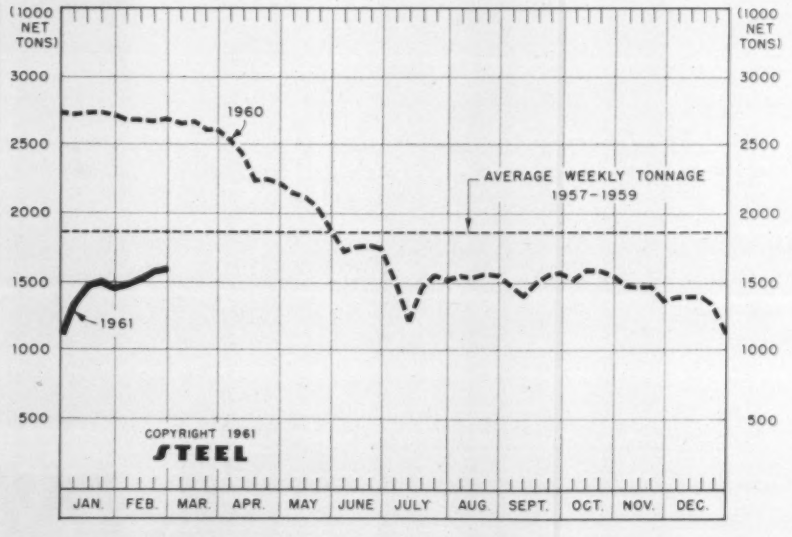
*Revised.
†Preliminary.
(a) Index based on average production 1957-59 as 100.
(b) Includes crucible steel.
Data from American Iron & Steel Institute.

STEEL INGOT PRODUCTION

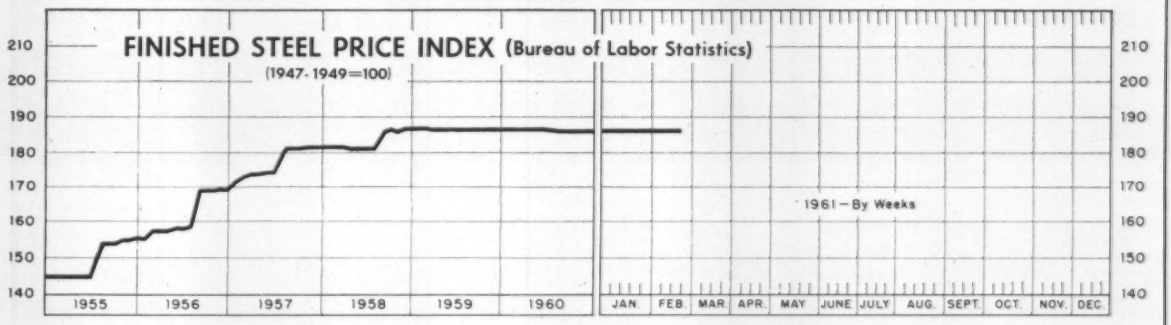
Weeks Ended	Net Tons	Change
Feb. 25	1,590,000*	+ 0.5%
Feb. 18	1,582,000	+ 3.8%
Feb. 11	1,524,000	+ 2.1%
Totals to Feb. 18		
1961	10,406,000	—45.0%
1960	18,930,000	

DISTRICTS	Week Ended —Feb. 18— Tons‡	Index†	Week Ended Feb. 11 Index†
Northeastern	224,445	84	80
Buffalo	72,043	74	74
Pittsburgh	302,662	75	70
Youngstown	141,084	83	84
Cleveland	71,298	77	78
Detroit	95,474	91	86
Chicago	340,409	91	90
Cincinnati	69,373	92	85
St. Louis	55,178	105	99
Southern	95,388	88	75
Western	115,744	99	101
Industry	1,582,000	84.9	81.8

*Estimated by STEEL. †1957-59=100.
‡District tonnages are approximate and will not necessarily add to the national total.



Price Indexes and Composites



Feb. 21, 1961	Week Ago	Month Ago	Feb. Index	Year Ago
186.2	186.2	186.2	186.2	186.8

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Feb. 21

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.825	Bars, H.R., Carbon	6.675
Rails, Light, 40 lb	7.292	Bars, Reinforcing	6.335
Tie Plates	6.875	Bars, C.F., Carbon	10.710
Axles, Railway	10.175	Bars, C.F., Alloy	14.125
Wheels, Freight Car, 33 in. (per wheel)	62.000	Bars, C.F., Stainless, 302 (lb)	0.570
Plates, Carbon	6.350	Sheets, H.R., Carbon	6.350
Structural Shapes	6.167	Sheets, C.R., Carbon	7.300
Bars, Tool Steel, Carbon (lb)	0.560	Sheets, Galvanized	8.775
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680	Sheets, C.R., Stainless, 302 (lb)	0.658
Bars, Tool Steel, H.R. Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400	Sheets, Electrical	12.625
Bars, Tool Steel, H.R. Alloys, High Speed, W18 Cr 4, V 1 (lb)	1.895	Strip, C.R., Carbon	9.489
Bars, H.R., Alloy	10.775	Strip, C.R., Stainless, 430 (lb)	0.480
Bars, H.R., Stainless, 303 (lb)	0.543	Strip, H.R., Carbon	6.250
		Pipe, Black, Buttweld (100 ft)	19.495
		Pipe, Galv., Buttweld (100 ft)	23.098
		Pipe, Line (100 ft)	195.430
		Casing, Oil Well, Carbon (100 ft)	201.080
		Casing, Oil Well, Alloy (100 ft)	315.213
		Tubes, Boiler (100 ft)	51.200
		Tubing, Mechanical, Carbon (100 ft)	27.005
		Tubing, Mechanical, Stainless, 304 (100 ft)	194.268
		Tin plate, Hot-dipped, 1.25 lb (95 lb base box)	10.100
		Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800
		Black Plate, Canmaking Quality (95 lb base box)	7.900
		Wire, Drawn, Carbon	10.575
		Wire, Drawn, Stainless, 430 (lb)	0.665
		Bale Ties (Bundles)	7.647
		Nails, Wire, 8d Common	9.433
		Wire, Barbed (80-rod spool)	8.372
		Woven Wire Fence (20-rod roll)	20.910

STEEL's FINISHED STEEL PRICE INDEX

	Feb. 22 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	247.82	247.82	247.82	247.82	209.10
Index in cents per lb	6.713	6.713	6.713	6.713	5.665

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT	$149.96	$149.96	$149.96	$149.96	$127.91
No. 2 Fdry, Pig Iron, GT	66.49	66.49	66.49	66.49	58.99
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	58.49
Malleable Pig Iron, GT	67.27	67.27	67.27	67.27	59.77
Steelmaking Scrap, GT	34.00	33.67	32.00	36.17	48.33

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Feb. 22 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.675	4.65
Bars, H.R., Chicago	5.675	5.675	5.675	5.675	4.65
Bars, H.R., deld., Philadelphia	5.97	5.97	5.97	5.975	4.90
Bars, C.R., Pittsburgh	7.65	7.65	7.65	7.65	6.25
Shapes, Std., Pittsburgh	5.50	5.50	5.50	5.50	4.60
Shapes, Std., Chicago	5.50	5.50	5.50	5.50	4.60
Shapes, deld., Philadelphia	5.745	5.745	5.745	5.77	4.88
Plates, Pittsburgh	5.30	5.30	5.30	5.30	4.50
Plates, Chicago	5.30	5.30	5.30	5.30	4.50
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.30	4.80
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.30	4.50
Plates, Claymont, Del.	5.30	5.30	5.30	5.30	4.80
Sheets, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.325
Sheets, H.R., Chicago	5.10	5.10	5.10	5.10	4.325
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.275	5.325
Sheets, C.R., Chicago	6.275	6.275	6.275	6.275	5.325
Sheets, C.R., Detroit	6.275	6.275	6.275	6.275	5.325-5.425
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.875	5.85
Strip, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.325
Strip, H.R., Chicago	5.10	5.10	5.10	5.10	4.325
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.425	6.25
Strip, C.R., Chicago	7.425	7.425	7.425	7.425	6.25-6.35
Strip, C.R., Detroit	7.425	7.425	7.425	7.425	6.35
Wire, Basic, Pittsburgh	8.00	8.00	8.00	8.00	6.60
Nails, Wire, nonstock, Pitts.	8.95	8.95	8.95	8.95	7.60
Tin Plate (1.50 lb) box, Pitts.	$10.65	$10.65	$10.65	$10.65	$9.45

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$99.50	$84.50
Wire rods, $\frac{7}{32}$-$\frac{9}{16}$" Pitts.	6.40	6.40	6.40	6.40	5.375

PIG IRON, Gross Ton	Feb. 22 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pittsburgh	$67.00	$67.00	$67.00	$67.00	$59.50
Basic, Valley	66.00	66.00	66.00	66.00	58.50
Basic, deld., Philadelphia	70.18	70.18	70.18	70.41	62.16
No. 2 Fdry, NevilleIsland,Pa.	66.50	66.50	66.50	66.50	59.00
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	59.00
No. 2 Fdry, deld., Phila.	70.68	70.68	70.68	70.91	62.66
No. 2 Fdry, Birmingham	62.50	62.50	62.50	62.50	55.00
No. 2 Fdry (Birm.),deld.,Cin.	70.20	70.20	70.20	70.20	62.70
Malleable, Valley	66.50	66.50	66.50	66.50	59.00
Malleable, Chicago	66.50	66.50	66.50	66.50	59.00
Ferromanganese, net tons†	245.00	245.00	245.00	245.00	205.00

†74-76% Mn, Duquesne, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$31.50	$31.50	$29.50	$36.50	$47.50
No. 1 Heavy Melt, E. Pa.	39.00	39.00	36.00	38.00	50.50
No. 1 Heavy Melt, Chicago	31.50	30.50	30.50	34.00	47.00
No. 1 Heavy Melt, Valley	32.50	32.50	32.50	39.50	52.50
No. 1 Heavy Melt, Cleve.	29.50	29.50	28.50	36.50	49.50
No. 1 Heavy Melt, Buffalo	27.50	27.50	27.50	36.50	46.50
Rails, Rerolling, Chicago	54.50	54.50	54.50	59.50	66.50
No. 1 Cast, Chicago	41.50	41.50	39.50	47.50	46.50

COKE, Net Ton					
Beehive, Furn., Connisvl.	$15.00	$15.00	$15.00	$15.00	$14.125
Beehive, Fdry., Connisvl.	18.25	18.25	18.25	18.25	16.50
Oven, Fdry., Milwaukee	32.00	32.00	32.00	32.00	27.50

Steel Prices

Mill prices as reported to STEEL, Feb. 22, cents per pound except as otherwise noted. *Changes shown in italics.* Code number following mill point indicates producing company. Key to producers, page 161; footnotes, page. 165.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 ....$76.00

INGOTS, Alloy (NT)
Detroit S41 ....$82.00
Economy,Pa. B14 ....82.00
Farrell,Pa. S3 ....82.00
Lowellville,O. S3 ....82.00
Midland,Pa. C18 ....82.00
Munhall,Pa. U5 ....82.00
Sharon,Pa. S3 ....82.00

BILLETS, BLOOMS & SLABS
Carbon Rerolling (NT)
Bartonville,Ill. K4 ..$82.00
Bessemer,Pa. U5 ....80.00
Buffalo R2 ....80.00
Clairton,Pa. U5 ....80.00
Ensley,Ala. T2 ....80.00
Fairfield,Ala. T2 ....80.00
Fontana,Calif. K1 ....90.50
Gary,Ind. U5 ....80.00
Johnstown,Pa. B2 ....80.00
Lackawanna,N.Y. B2 ..80.00
Munhall,Pa. U5 ....80.00
Owensboro,Ky. G8 ....80.00
S.Chicago,Ill. R2, U5 ..80.00
S.Duquesne,Pa. U5 ....80.00
Sterling,Ill. N15 ....80.00
Youngstown R2 ....80.00

Carbon, Forging (NT)
Bessemer,Pa. U5 ....$99.50
Buffalo R2 ....99.50
Canton,O. R2 ....102.00
Clairton,Pa. U5 ....99.50
Conshohocken,Pa. A3 .104.50
Ensley,Ala. T2 ....99.50
Fairfield,Ala. T2 ....99.50
Farrell,Pa. S3 ....99.50
Fontana,Calif. K1 ....109.00
Gary,Ind. U5 ....99.50
Geneva,Utah C11 ....99.50
Houston S5 ....104.50
Johnstown,Pa. B2 ....99.50
Lackawanna,N.Y. B2 ..99.50
LosAngeles B3 ....109.00
Midland,Pa. C18 ....99.50
Munhall,Pa. U5 ....99.50
Owensboro,Ky. G8 ....99.50
Seattle B3 ....109.00
Sharon,Pa. S3 ....99.50
S.Chicago R2, U5, W14..99.50
S.Duquesne,Pa. U5 ....99.50
S.SanFrancisco B3 ....109.00
Warren,O. C17 ....99.50

Alloy, Forging (NT)
Bethlehem,Pa. B2 ...$119.00
Bridgeport,Conn. C32..119.00
Buffalo R2 ....119.00
Canton,O. R2, T7 ....119.00
Conshohocken,Pa. A3 .126.00
Detroit S41 ....119.00
Economy,Pa. B14 ....119.00
Farrell,Pa. S3 ....119.00
Fontana,Calif. K1 ....140.00
Gary,Ind. U5 ....119.00
Houston S5 ....124.00
Ind.Harbor,Ind. Y1 ....119.00
Johnstown,Pa. B2 ....119.00
Lackawanna,N.Y. B2..119.00
LosAngeles B3 ....139.00
Lowellville,O. S3 ....119.00
Massillon,O. R2 ....119.00
Midland,Pa. C18 ....119.00
Munhall,Pa. U5 ....119.00
Owensboro,Ky. G8 ....119.00
Seattle(6) B3 ....140.00
Sharon,Pa. S3 ....119.00
S.Chicago R2,U5,W14 ..119.00
S.Duquesne,Pa. U5 ....119.00
Struthers,O. Y1 ....119.00
Warren,O. C17 ....119.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 ....$122.50
Canton,O. R2 ....125.00
Cleveland R2 ....122.50
Gary,Ind. U5 ....122.50
S.Chicago,Ill. R2,W14 ..122.50
S.Duquesne,Pa. U5 ...122.50
Warren,O. C17 ....122.50

SKELP
Aliquippa,Pa. J5 ....5.05
Benwood,W.Va. W10 ...5.05
Ind.Harbor,Ind. Y1 ....5.05
Munhall,Pa. U5 ....5.05
Pittsburgh J5 ....5.05
Warren,O. R2 ....5.05
Youngstown R2, U5 ....5.05

WIRE RODS
AlabamaCity,Ala. R2 ..6.40
Aliquippa,Pa. J5 ....6.40
Alton,Ill. L1 ....6.60
Bartonville,Ill. K4 ....6.50
Buffalo W12 ....6.40
Cleveland A7 ....6.40
Donora,Pa. A7 ....6.40
Fairfield,Ala. T2 ....6.40
Houston S5 ....6.65
IndianaHarbor,Ind. Y1..6.40
Johnstown,Pa. B2 ....6.40
Joliet,Ill. A7 ....6.40
KansasCity,Mo. S5 ....6.65
Kokomo,Ind. C16 ....6.50
LosAngeles B3 ....7.20
Minnequa,Colo. C10 ....6.65
Monessen,Pa. P7 ....6.40
Pittsburg,Calif. C11 ....7.20
Portsmouth,O. P12 ....6.40
Roebling,N.J. R5 ....6.50
S.Chicago,Ill. R2, W14..6.40
SparrowsPoint,Md. B2 ..6.50
Sterling,Ill.(1) N15 ....6.40
Sterling,Ill. N15 ....6.50
Struthers,O. Y1 ....6.40
Worcester,Mass. A7 ....6.70

STRUCTURALS

Carbon Steel Std. Shapes
AlabamaCity,Ala. R2 ...5.50
Aliquippa,Pa. J5 ....5.50
Atlanta A11 ....5.70
Bessemer,Ala. T2 ....5.50
Bethlehem,Pa. B2 ....5.55
Birmingham C15 ....5.50
Clairton,Pa. U5 ....5.50
Fairfield,Ala. T2 ....5.50
Fontana,Calif. K1 ....6.30
Gary,Ind. U5 ....5.50
Geneva,Utah C11 ....5.50
Houston S5 ....5.60
Ind.Harbor,Ind. I-2, Y1..5.50
Johnstown,Pa. B2 ....5.55
Joliet,Ill. P22 ....5.50
KansasCity,Mo. S5 ....5.60
Lackawanna,N.Y. B2 ..5.55
LosAngeles B3 ....6.20
Minnequa,Colo. C10 ....5.80
Munhall,Pa. U5 ....5.50
Niles,Calif. P1 ....6.25
Phoenixville,Pa. P4 ....5.55
Portland,Oreg. O4 ....6.25
Seattle B3 ....6.25
S.Chicago,Ill. U5, W14 ..5.50
S.SanFrancisco B3 ....6.15
Sterling,Ill. N15 ....5.50
Torrance,Calif. C11 ....6.20
Weirton,W.Va. W6 ....5.50

Wide Flange
Bethlehem,Pa. B2 ....5.55
Clairton,Pa. U5 ....5.50
Fontana,Calif. K1 ....6.45
IndianaHarbor,Ind. I-2..5.50
Lackawanna,N.Y. B2 ..5.55
Munhall,Pa. U5 ....5.50
Phoenixville,Pa. P4 ....5.55
S.Chicago,Ill. U5 ....5.50
Sterling,Ill. N15 ....5.50
Weirton,W.Va. W6 ....5.50

Alloy Std. Shapes
Aliquippa,Pa. J5 ....6.80
Clairton,Pa. U5 ....6.80
Gary,Ind. U5 ....6.80
Houston S5 ....6.90
Munhall,Pa. U5 ....6.80
S.Chicago,Ill. U5, W14..6.80

H.S., L.A., Std. Shapes
Aliquippa,Pa. J5 ....8.05
Bessemer,Ala. T2 ....8.05
Bethlehem,Pa. B2 ....8.10
Clairton,Pa. U5 ....8.05
Fairfield,Ala. T2 ....8.05
Fontana,Calif. K1 ....8.85
Gary,Ind. U5 ....8.05
Geneva,Utah C11 ....8.05
Houston S5 ....8.15
Ind.Harbor,Ind. I-2, Y1..8.05
Johnstown,Pa. B2 ....8.10
KansasCity,Mo. S5 ....8.15
Lackawanna,N.Y. B2 ..8.10
LosAngeles B3 ....8.75
Munhall,Pa. U5 ....8.05
Seattle B3 ....8.80
S.Chicago,Ill. U5, W14..8.05
S.SanFrancisco B3 ....8.70
Sterling,Ill. N15 ....7.75
Struthers,O. Y1 ....8.05

H.S., L.A., Wide Flange
Bethlehem,Pa. B2 ....8.10
Ind.Harbor,Ind. I-2 ....8.05
Lackawanna,N.Y. B2 ..8.10
Munhall,Pa. U5 ....8.05
S.Chicago,Ill. U5 ....8.05
Sterling,Ill. N15 ....7.75

PILING

BEARING PILES
Bethlehem,Pa. B2 ....5.55
Ind.Harbor,Ind. I-2 ....5.50
Lackawanna,N.Y. B2 ..5.55
Munhall,Pa. U5 ....5.50
S.Chicago,Ill. I-2, U5 ..5.50

STEEL SHEET PILING
Ind.Harbor,Ind. I-2 ....6.50
Lackawanna,N.Y. B2 ....6.50
Munhall,Pa. U5 ....6.50
S.Chicago,Ill. I-2, U5 ....6.50
Weirton,W.Va. W6 ....6.50

PLATES

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ...5.30
Aliquippa,Pa. J5 ....5.30
Ashland,Ky.(15) A10 ...5.30
Atlanta A11 ....5.50
Bessemer,Ala. T2 ....5.30
Clairton,Pa. U5 ....5.30
Claymont,Del. P4 ....5.30
Cleveland J5, R2 ....5.30
Coatesville,Pa. L7 ....5.30
Conshohocken,Pa. A3 ..5.30
Ecorse,Mich. G5 ....5.30
Fairfield,Ala. T2 ....5.30
Farrell,Pa. S3 ....5.30
Fontana,Calif.(30) K1 ..6.10
Gary,Ind. U5 ....5.30
Geneva,Utah C11 ....5.30
GraniteCity,Ill. G4 ....5.40
Houston S5 ....5.40
Ind.Harbor,Ind. I-2, Y1 .5.30
Johnstown,Pa. B2 ....5.30
Lackawanna,N.Y. B2 ...5.30
Mansfield,O. E6 ....5.30
Minnequa,Colo. C10 ....6.15
Munhall,Pa. U5 ....5.30
Newport,Ky. A2 ....5.30
Pittsburgh J5 ....5.30
Riverdale,Ill. A1 ....5.30
Seattle B3 ....6.20
Sharon,Pa. S3 ....5.30
S.Chicago,Ill. U5, W14..5.30
SparrowsPoint,Md. B2 ..5.30
Sterling,Ill. N15 ....5.30
Steubenville,O. W10 ....5.30
Warren,O. R2 ....5.30
Youngstown U5, Y1 ....5.30
Youngstown(27) R2 ....5.30

PLATES, Carbon Abras. Resist.
Claymont,Del. P4 ....7.05
Fontana,Calif. K1 ....7.85
Geneva,Utah C11 ....7.05
Houston S5 ....7.15
Johnstown,Pa. B2 ....7.05
SparrowsPoint,Md. B2 ..7.05

PLATES, Wrought Iron
Economy,Pa. B14 ....14.10

PLATES, H.S., L.A.
Aliquippa,Pa. J5 ....7.95
Ashland,Ky. A10 ....7.95
Bessemer,Ala. T2 ....7.95
Clairton,Pa. U5 ....7.95
Claymont,Del. P4 ....7.95
Cleveland J5, R2 ....7.95
Coatesville,Pa. L7 ....7.95
Conshohocken,Pa. A3 ..7.95
Economy,Pa. B14 ....7.95
Ecorse,Mich. G5 ....7.95
Fairfield,Ala. T2 ....7.95
Farrell,Pa. S3 ....7.95
Fontana,Calif.(30) K1 ..8.75
Gary,Ind. U5 ....7.95
Geneva,Utah C11 ....7.95
Houston S5 ....8.05
Ind.Harbor,Ind. I-2, Y1..7.95
Johnstown,Pa. B2 ....7.95
Munhall,Pa. U5 ....7.95
Pittsburgh J5 ....7.95
Seattle B3 ....8.85
Sharon,Pa. S3 ....7.95
S.Chicago,Ill. U5, W14..7.95
SparrowsPoint,Md. B2 ..7.95
Sterling,Ill. N15 ....7.625
Warren,O. R2 ....7.95
Youngstown U5, Y1 ....7.95

PLATES, Alloy
Aliquippa,Pa. J5 ....7.50
Claymont,Del. P4 ....7.50
Coatesville,Pa. L7 ....7.50
Economy,Pa. B14 ....7.50
Farrell,Pa. S3 ....7.50
Fontana,Calif. K1 ....8.30
Gary,Ind. U5 ....7.50
Houston S5 ....7.60
Ind.Harbor,Ind. Y1 ....7.50
Johnstown,Pa. B2 ....7.50
Lowellville,O. S3 ....7.50
Munhall,Pa. U5 ....7.50
Newport,Ky. A2 ....7.50
Pittsburgh J5 ....7.50
Seattle B3 ....8.40
Sharon,Pa. S3 ....7.50
S.Chicago,Ill. U5, W14..7.50
SparrowsPoint,Md. B2 ..7.50
Youngstown Y1 ....7.50

FLOOR PLATES
Cleveland J5 ....6.375
Claymont,Del. P4 ....6.375
Conshohocken,Pa. A3 ..6.375
Ind.Harbor,Ind. I-2 ..6.375
Munhall,Pa. U5 ....6.375
Pittsburgh J5 ....6.375
S.Chicago,Ill. U5 ....6.375

PLATES, Ingot Iron
Ashland c.l.(15) A10 ...5.55
Ashland l.c.l.(15) A10 ..6.05
Cleveland c.l. R2 ....6.05
Warren,O. R2 ....6.05

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)
Ala.City,Ala.(9) R2 ...5.675
Aliquippa,Pa.(9) J5 ...5.675
Alton,Ill. L1 ....5.875
Atlanta(9) A11 ....5.875
Bessemer,Ala.(9) T2 ...5.675
Birmingham(9) C15 ...5.675
Buffalo(9) R2 ....5.675
Canton,O.(23) R2 ....6.15
Clairton,Pa.(9) U5 ...5.675
Cleveland(9) R2 ....5.675
Ecorse,Mich.(9) G5 ...5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala.(9) T2 ...5.675
Fairless,Pa.(9) U5 ...5.825
Fontana,Calif.(9) K1 ..6.375
Gary,Ind.(9) U5 ....5.675
Houston(9) S5 ....5.925
Ind.Harbor(9) I-2, Y1..5.675
Johnstown,Pa.(9) B2 ..5.675
Joliet,Ill. P2 ....5.675
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ....5.675
LosAngeles(9) B3 ....6.375
Massillon,O.(23) R2 ....6.15
Midland,Pa.(23) C18 ..6.025
Milton,Pa. M18 ....5.825
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 ....6.375
Owensboro,Ky.(9) G8 ..6.025
Pittsburg,Calif.(9) C11..6.375
Pittsburgh(9) J5 ....5.675
Portland,Oreg. O4 ....6.425
Riverdale,Ill.(9) A1 ...5.675
Seattle(9) A24,B3,N15 ..6.425
S.Ch'c'go(9)R2,U5,W14 5.675
S.Duquesne,Pa.(9) U5..5.675
S.SanFran.,Calif.(9)B3 6.425
Sterling,Ill.(1)(9) N15..5.675
Steri.ng,Ill.(9) N15 ...5.775
Struthers,O.(9) Y1 ...5.675
Tonawanda,N.Y. B12 ..5.675
Torrance,Calif.(9) C11..6.375
Warren,O. C17 ....6.025
Youngstown(9) R2,U5..5.675

BARS, Hot-Rolled Alloy
Aliquippa,Pa. J5 ....6.725
Bethlehem,Pa. B2 ....6.725
Bridgeport,Conn. C32 ...6.80
Buffalo R2 ....6.725
Canton,O. R2, T7 ....6.725
Clairton,Pa. U5 ....6.725
Detroit S41 ....6.725
Economy,Pa. B14 ....6.725
Ecorse,Mich. G5 ....6.725
Farrell,Pa. S3 ....6.725
Fontana,Calif. K1 ....7.775
Gary,Ind. U5 ....6.725
Houston S5 ....6.975
Ind.Harbor,Ind. I-2, Y1 6.725
Johnstown,Pa. B2 ....6.725
KansasCity,Mo. S5 ....6.975
Lackawanna,N.Y. B2 ..6.725
LosAngeles B3 ....7.775
Lowellville,O. S3 ....6.725
Massillon,O. R2 ....6.725
Midland,Pa. C18 ....6.725
Owensboro,Ky. G8 ....6.725
Pittsburgh J5 ....6.725
Seattle(6) B3 ....7.825
Sharon,Pa. S3 ....6.725
S.Chicago R2, U5, W14..6.725
S.Duquesne,Pa. U5 ....6.725
Struthers,O. Y1 ....6.725
Warren,O. C17 ....6.725
Youngstown U5 ....6.725

BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy
Aliquippa,Pa. J5 ....8.30
Bessemer,Ala. T2 ....8.30
Bethlehem,Pa. B2 ....8.30
Clairton,Pa. U5 ....8.30
Cleveland R2 ....8.30
Ecorse,Mich. G5 ....8.30
Fairfield,Ala. T2 ....8.30
Fontana,Calif. K1 ....9.00
Gary,Ind. U5 ....8.30
Houston S5 ....8.55
Ind.Harbor,Ind. Y1 ....8.30
Johnstown,Pa. B2 ....8.30
KansasCity,Mo. S5 ....8.55
Lackawanna,N.Y. B2 ..8.30
LosAngeles B3 ....9.00
Pittsburgh J5 ....8.30
Seattle B3 ....9.05
S.Chicago,Ill. R2, W14..8.30
S.Duquesne,Pa. U5 ....8.30
S.SanFrancisco B3 ....9.05
Sterling,Ill. N15 ....7.925
Struthers,O. Y1 ....8.30
Youngstown U5 ....8.30

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa.(9) B2 ..5.825
Houston(9) S5 ....5.925
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ....5.675
Sterling,Ill. N15 ....5.775
Sterling,Ill.(1) N15 ...5.675
Tonawanda,N.Y. B12 ..5.675

BAR SIZE ANGLES; S. SHAPES
Aliquippa,Pa. J5 ....5.675
Atlanta A11 ....5.875
Joliet,Ill. P22 ....5.675
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 ....6.375
Pittsburgh J5 ....5.675
Portland,Oreg. O4 ....6.425
SanFrancisco S7 ....6.52
Seattle B3 ....6.425

BAR SIZE ANGLES; S. SHAPES
Wrought Iron
Economy,Pa. B14 ....16.45

BAR SHAPES, Hot-Rolled Alloy
Aliquippa,Pa. J5 ....6.80
Clairton,Pa. U5 ....6.80
Gary,Ind. U5 ....6.80
Houston S5 ....7.05
KansasCity,Mo. S5 ....7.05
Pittsburgh J5 ....6.80
Youngstown U5 ....6.80

BARS, C.F. Leaded (Including leaded extra)
Carbon
LosAngeles P2, S30 ..11.75*
Alloy
Ambridge,Pa. W18 ...10.175
BeaverFalls,Pa. M12 ..10.175
Camden,N.J. P13 ....10.35
Chicago W18 ....10.175
Elyria,O. W8 ....10.175
Monaca,Pa. S17 ....10.175
Newark,N.J. W18 ....10.35
SpringCity,Pa. K3 ....10.35

*Grade A; add 0.5c for Grade B.

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....7.65
BeaverFalls,Pa. M12,R2..7.65
Birmingham C15 ....8.25
Buffalo B5 ....7.70
Camden,N.J. P13 ....8.10
Carnegie,Pa. C12 ....7.65
Chicago W18 ....7.65
Cleveland A7, C20 ....7.65
Detroit B5, P17 ....7.85
Detroit S41 ....7.65
Donora,Pa. A7 ....7.65
Elyria,O. W8 ....7.65
FranklinPark,Ill. N5 ...7.65
Gary,Ind. R2 ....7.65
GreenBay,Wis. F7 ....7.65
Hammond,Ind. J5, L2 ...7.65
Hartford,Conn. R2 ....8.15
Harvey,Ill. B5 ....7.65
LosAngeles(49) S30 ....9.10
LosAngeles(49) P2, R2..9.10
Mansfield,Mass. B5 ....8.20
Massillon,O. R2, R8 ....7.65
Midland,Pa. C18 ....7.65
Monaca,Pa. S17 ....7.65
Newark,N.J. W18 ....8.10
NewCastle,Pa.(17) B4 ..7.65
Pittsburgh J5 ....7.65
Plymouth,Mich. P5 ....7.90
Putnam,Conn. W18 ....8.20
Readville,Mass. C14 ....8.20
Seattle(49) S30 ....9.10
S.Chicago,Ill. W14 ....7.65
SpringCity,Pa. K3 ....8.10
Struthers,O. Y1 ....7.65
Warren,O. C17 ....7.65
Waukegan,Ill. A7 ....7.65
Willimantic,Conn. J5 ...8.15
Youngstown F3, Y1 ....7.65

BARS, Cold-Finished Carbon (Turned and Ground)
Cumberland,Md.(5) C19..6.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....9.025
BeaverFalls,Pa. M12,R2 9.025
Bethlehem,Pa. B2 ....9.025
Bridgeport,Conn. C32 ..9.175
Buffalo B5 ....9.025
Camden,N.J. P13 ....9.20
Canton,O. T7 ....9.025
Carnegie,Pa. C12 ....9.025
Chicago W18 ....9.025
Cleveland A7, C20 ....9.025
Detroit B5, P17 ....9.225
Detroit S41 ....9.025
Donora,Pa. A7 ....9.025
Elyria,O. W8 ....9.025
FranklinPark,Ill. N5 ...9.025
Gary,Ind. R2 ....9.025
GreenBay,Wis. F7 ....9.025
Hammond,Ind. J5, L2..9.025
Hartford,Conn. R2 ....9.325
Harvey,Ill. R5 ....9.025
Lackawanna,N.Y. B3 ..9.025
LosAngeles P2, S30 ...11.00
Mansfield,Mass. B5 ...9.325
Massillon,O. R2, R8 ...9.025
Midland,Pa. C18 ....9.025
Monaca,Pa. S17 ....9.025
Newark,N.J. W18 ....9.20
Plymouth,Mich. P5 ....9.225
S.Chicago,Ill. W14 ....9.025
SpringCity,Pa. K3 ....9.20

Struthers,O. Y1 .....9.025
Warren,O. C17 .....9.025
Waukegan,Ill. A7 .....9.025
Willimantic,Conn. J5 ..9.325
Worcester,Mass. A7 ...9.325
Youngstown Y3, Y1 ...9.025

BARS, Reinforcing, Billet (To Fabricators)

AlabamaCity,Ala. R2 ..5.675
Atlanta A11 .....5.25
Birmingham C15 .....5.25
Buffalo R2 .....5.675
Cleveland R2 .....5.675
Ecorse,Mich. G5 .....5.675
Emeryville,Calif. J7 ..6.425
Fairfield,Ala. T2 .....5.675
Fairless,Pa. U5 .....5.825
Fontana,Calif. K1 ....6.375
Ft.Worth,Tex.(26) T4 ..5.50
Gary,Ind. U5 .....5.675
Houston S5 .....5.675
Ind.Harbor,Ind. I-2, Y1.5.675
Johnstown,Pa. B2 .....5.675
Joliet,Ill. P22 .....5.675
KansasCity,Mo. S5 ....5.675
Kokomo,Ind. C16 .....5.775
Lackawanna,N.Y. B2..5.675
LosAngeles B3 .....6.375
Madison,Ill. L1 .....5.875
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 .....6.375
Pittsburg,Calif. C11 ..6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 ....6.425
SandSprings,Okla. S5 ..5.675
Seattle A24, B3, N14 ..6.425
S.Chicago,Ill. R2, W14.5.675
S.Duquesne,Pa. U5 ....5.675
S.SanFrancisco B3 ....6.425
SparrowsPoint,Md. B2..5.675
Steelton,Pa. B2 .....5.675
Sterling,Ill. (1) N15 ...5.675
Sterling,Ill. N15 .....5.775
Struthers,O. Y1 .....5.675
Tonawanda,N.Y. B12 ...6.10
Torrance,Calif. C11 ..6.375
Youngstown R2, U5 ..5.675

BARS, Reinfocing, Billet (Fabricated: to Consumers)

Baltimore B2 .....7.42
Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Houston S5 .....7.35
Johnstown,Pa. B2 .....7.33
KansasCity,Mo. S5. ..7.35
Lackawanna,N.Y. B2 ..7.35
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5, U8 ....7.35
SandSprings,Okla. S5 ...7.35
Seattle A24, B3, N14 ..7.95
SparrowsPoint,Md. B2 ..7.33
St.Paul U8 .....8.17
Williamsport,Pa. S19 ...7.25

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 15.10
Economy,Pa.(D.R.)B14 19.30
Econ.(DirectRolled)B14 13.55
Economy(Staybolt)B14 19.80
McK.Rks.(S.R.) L5 ..14.50
McK.Rks.(D.R.) L5 ..19.80
McK.Rks.(Staybolt)L5 .20.95

BARS, Rail Steel

ChicagoHts.(3) C2, I-2.5.575
ChicagoHts.(4)(44) I-2.5.675
ChicagoHts.(4) C2 ....5.675
Franklin,Pa.(3) F5 ....5.575
Franklin,Pa.(4) F5 ....5.675
JerseyShore,Pa.(3) J8 ..5.55
Marion,O.(3) P11 ....5.575
Tonawanda(3) B12 ...5.575
Tonawanda(4) B12 ....6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

AlabamaCity,Ala. R2 ...5.10
Allenport,Pa. P7 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky.(8) A10 ....5.10
Cleveland J5, R2 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit(8) M1 .....5.10
Ecorse,Mich G5 .....5.10
Fairfield,Ala. T2 .....5.10
Fairless,Pa. U5 .....5.15
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.20
GraniteCity,Ill.(8) G4 ...5.20
Ind.Harbor,Ind. I-2, Y1.5.10
Irvin,Pa. U5 .....5.10
Lackawanna,N.Y. B2 ..5.10
Mansfield,O. E6 .....5.10
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Niles,O. M21, S3 .....5.10
Pittsburg,Calif. C11 ....5.80
Pittsburgh J5 .....5.10
Portsmouth,O. P12 ....5.10
Riverdale,Ill. A1 .....5.10
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14..5.10
SparrowsPoint,Md. B2 ..5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 .....5.10
Weirton,W.Va. W6 ....5.10
Youngstown U5, Y1 ....5.10

SHEETS, H.R. (19 Ga. & Lighter)

Niles,O. M21, S3 .....6.275

SHEETS, H. R. Alloy

Gary,Ind. U5 .....8.40
Ind.Harbor,Ind. Y1 ....8.40
Irvin,Pa. U5 .....8.40
Munhall,Pa. U5 .....8.40
Newport,Ky. A2 .....8.40
Youngstown U5, Y1 ....8.40

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....7.525
Ashland,Ky. A10 .....7.525
Cleveland J5, R2 .....7.525
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.525
Fairless,Pa. U5 .....7.575
Farrell,Pa. S3 .....7.525
Fontana,Calif. K1 ....8.25
Gary,Ind. U5 .....7.525
Ind.Harbor,Ind. I-2, Y1 7.525
Irvin,Pa. U5 .....7.525
Lackawanna(35) B2 ...7.525
Munhall,Pa. U5 .....7.525
Niles,O. S3 .....7.525
Pittsburgh J5 .....7.525
S.Chicago,Ill. U5, W14.7.525
Sharon,Pa. S3 .....7.525
SparrowPoint (36) B2..7.525
Warren,O. R2 .....7.525
Weirton,W.Va. W6 ....7.525
Youngstown U5, Y1 ...7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ...5.35
Cleveland R2 .....5.875
Warren,O. R2 .....5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....7.05
Middletown,O. A10 ....6.775
Warren,O. R2 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 6.275
Aliquippa,Pa. J5 .....6.275
Allenport,Pa. P7 .....6.275
Cleveland J5, R2 .....6.275
Conshocken,Pa. A3 ..6.325
Detroit M1 .....6.275
Ecorse,Mich. G5 .....6.275
Fairfield,Ala. T2 .....6.275
Fairless,Pa. U5 .....6.325
Follansbee,W.Va. F4 ..6.275
Fontana,Calif. K1 .....7.40
Gary,Ind. U5 .....6.275
GraniteCity,Ill. G4 ....6.375
Ind.Harbor,Ind. I-2, Y1 6.275
Irvin,Pa. U5 .....6.275
Lackawanna,N.Y. B2 ..6.275
Mansfield,O. E6 .....6.275
Middletown,O. A10 ....6.275
Newport,Ky. A2 .....6.275
Pittsburg,Calif. C11 ..7.225
Pittsburgh J5 .....6.275
Portsmouth,O. P12 ....6.275
SparrowsPoint,Md. B2..6.275
Steubenville,O. W10 ...6.275
Warren,O. R2 .....6.275
Weirton,W.Va. W6 ....6.275
Yorkville,O. W10 ....6.275
Youngstown Y1 .....6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....9.275
Cleveland J5, R2 .....9.275
Ecorse,Mich. G5 .....9.275
Fairless,Pa. U5 .....9.325
Fontana,Calif. K1 .....10.40
Gary,Ind. U5 .....9.275
Ind.Harbor,Ind. I-2, Y1 9.275
Lackawanna(38) B2 ..9.275
Pittsburgh J5 .....9.275
SparrowsPoint(33) B2..9.275
Warren,O. R2 .....9.275
Weirton,W.Va. W6 ....9.275
Youngstown Y1 .....9.275

SHEETS, Culvert

	Cu Steel	Cu Fe
Ala.City,Ala. R2	7.225	....
Ashland,Ky. A10	7.225	7.475
Canton,O. R2	7.225	....
Fairfield,Ala. T2	7.225	7.475
Gary,Ind. U5	7.225	7.475
GraniteCity,Ill.G4	7.325	....
Ind.Harbor I-2	7.225	7.475
Irwin,Pa. U5	7.225	7.475
Kokomo,Ind. C16	7.325	....
MartinsFry. W10	7.225	7.475
Pitts.,Calif. C11	7.975	....
Pittsburgh J5	7.225	....
SparrowsPt. B2	7.225	....

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ...7.475

SHEETS, Enameling

Ashland,Ky. A10 .....6.775
Cleveland R2 .....6.775
Fairfield,Ala. T2 .....6.775
Gary,Ind. U5 .....6.775
Ind.Harbor,Ind. I-2, Y1 6.775
Irvin,Pa. U5 .....6.775
Middletown,O. A10 ....6.775
Niles,O. M21, S3 .....6.775
SparrowsPoint,Md. B2..6.775
Youngstown Y1 .....6.775

BLUED STOCK, 29 Gage

Dover,O. E6 .....8.70
Ind.Harbor,Ind. I-2 ....8.70
Mansfield,O. E6 .....8.70
Warren,O. R2 .....8.70
Yorkville,O. W10 .....8.70

SHEETS, Long Terne, Steel

Follansbee,W.Va. W10 .7.225
Gary,Ind. U5 .....7.225
Mansfield,O. E6 .....7.225
Middletown,O. A10 ....7.225
Niles,O. M21, S3 .....7.225
Warren,O. R2 .....7.225

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.625

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 9.525
Butler,Pa. A10 (type 2) 9.625
Irvin,Pa. U5 (type 1) ..9.525

SHEETS, Well Casing

Fontana,Calif. K1 ....7.325
Geneva,Utah C11 .....6.80

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....10.125
Pittsburgh J5 .....10.125
SparrowsPt.(39) B2 ..10.025

Sheets, Galvannealed Steel

Canton,O. R2 .....7.275
Irvin,Pa. U5 .....7.275

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 ....7.125
Middletown,O. A10 ....7.125

SHEETS, Electrogalvanized

Cleveland(28) R2 ....7.65
Niles,O.(28) R2 .....7.65
Weirton,W.Va. W6 ....7.50

SHEETS, Galvanized Steel Hot-Dipped

AlabamaCity,Ala. R2. .6.875‡
Ashland,Ky. A10 ....6.875‡
Canton,O. R2 .....6.875‡
Dover,O. E6 .....6.875†
Fairfield,Ala. T2 ....6.875†
Gary,Ind. U5 .....6.875†
GraniteCity,Ill. G4 ...6.975*
Ind.Harbor,Ind. I-2 ..6.875†
Irvin,Pa. U5 .....6.875†
Kokomo,Ind. C16 .....6.975‡
MartinsFerry,O. W10. .6.875*
Middletown,O. A10 ....6.875†
Pittsburg,Calif. C11 ...7.625*
Pittsburgh J5 .....6.875†
SparrowsPt.,Md. B2 ...6.875†
Warren,O. R2 .....6.875†
Weirton,W.Va. W6 ...6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

Key to Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A24 Alaska Steel Mills Inc.
A25 Algoma Steel Corp. Ltd.

B1 Babcock & Wilcox
B2 Bethlehem Steel Co.
B3 Bethlehem Steel Co., Pacific Coast Div.
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co., Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel of N.Eng.

D2 Detroit Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E6 Empire-Reeves Steel
E10 Enamel Prod. & Plating

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Specialty Wire Co. Inc.
M17 Metal Forming Corp.
M18 Milton Steel Div., Merritt-Chapman&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.
M23 Mill Strip Products Co. of Pennsylvania

N1 National-Standard Co.
N2 National Supply, Armco Steel Corp.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S.&W. Co.
N20 Neville Ferro Alloy Co.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div., Eaton Mfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Div., Bliss & Laughlin Inc.
S40 Seneca Steel Service
S41 Stainless & Strip Div., J & L Steel Corp.
S42 Southern Elec. Steel Co.
S43 Seymour Mfg. Co.
S44 Screw & Bolt Corp. of America
S45 Somers Brass Co.
S46 Steel Co. of Canada

T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Products & Chemical Corp.
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U3 Union Wire Rope, Armco Steel Corp.
U4 Universal-Cyclops Steel
U5 U. S. Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.
U11 Union Carbide Metals Co.
U13 Union Steel Corp.

V2 Vanadium-Alloy Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.

W1 Wallace Barnes Steel Div., Associated Spring
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet & Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala. City, Ala. (27) R2 ... 5.10
Allenport, Pa. P7 ... 5.10
Alton, Ill. L1 ... 5.30
Ashland, Ky. (8) A10 ... 5.10
Atlanta A11 ... 5.10
Bessemer, Ala. T2 ... 5.10
Birmingham C15 ... 5.10
Conshohocken, Pa. A3 ... 5.15
Detroit M1 ... 5.10
Ecorse, Mich. G5 ... 5.10
Fairfield, Ala T2 ... 5.10
Farrell, Pa. S3 ... 5.10
Fontana, Calif. K1 ... 5.825
Gary, Ind. U5 ... 5.10
Ind. Harbor, Ind. I-2, Y1 .. 5.10
Johnstown, Pa. (25) B2 .. 5.10
Lackaw'na, N.Y. (25) B2 .. 5.10
LosAngeles (25) B3 ... 5.85
LosAngeles C1 ... 8.60
Minnequa, Colo. C10 ... 6.20
Riverdale, Ill. A1 ... 5.10
SanFrancisco S7 ... 6.60
Seattle (25) B3 ... 6.10
Seattle N14 ... 6.60
Sharon, Pa. S3 ... 5.10
S. Chicago, Ill. W14 ... 5.10
S. SanFrancisco (25) B3 .. 5.85
SparrowsPoint, Md. B2 .. 5.10
Torrance, Calif. C11 ... 5.85
Warren, O. R2 ... 5.10
Weirton, W. Va. W6 ... 5.10
Youngstown U5 ... 5.10

STRIP, Hot-Rolled Alloy

Carnegie, Pa. S18 ... 8.40
Farrell, Pa. S3 ... 8.40
Gary, Ind. U5 ... 8.40
Houston S5 ... 8.65
Ind. Harbor, Ind. Y1 ... 8.40
KansasCity, Mo. S5 ... 8.65
LosAngeles B3 ... 9.60
Lowellville, O. S3 ... 8.40
Newport, Ky. A2 ... 8.40
Sharon, Pa. A2, S3 ... 8.40
S. Chicago, Ill. W14 ... 8.40
Youngstown U5, Y1 ... 8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland, Ky. A10 ... 7.575
Bessemer, Ala. T2 ... 7.575
Conshohocken, Pa. A3 .. 7.575
Ecorse, Mich. G5 ... 7.575
Fairfield, Ala. T2 ... 7.575
Farrel, Pa. S3 ... 7.575
Gary, Ind. U5 ... 7.575
Ind. Harbor, Ind. I-2, Y1 7.575
Lackawanna, N.Y. B2 .. 7.575
LosAngeles (25) B3 ... 8.325
Seattle (25) B3 ... 8.575
Sharon, Pa. S3 ... 7.575
S. Chicago, Ill. W14 ... 7.575
S. SanFrancisco (25) B3 .. 8.325
SparrowsPoint, Md. B2 .. 7.575
Warren, O. R2 ... 7.575
Weirton, W. Va. W6 ... 7.575
Youngstown U5, Y1 ... 7.575

STRIP, Hot-Rolled Ingot Iron

Ashland, Ky. (8) A10 ... 5.35
Warren, O. R2 ... 5.875

STRIP, Cold-Rolled Carbon

Anderson, Ind. G6 ... 7.425
Baltimore T6 ... 7.425
Boston T6 ... 7.975
Buffalo S40 ... 7.425
Cleveland A7, J5 ... 7.425
Dearborn, Mich. S3 ... 7.425
Detroit D2, M1, P20 .. 7.425
Dover, O. G6 ... 7.425
Evanston, Ill. M22 ... 7.525
Farrell, Pa. S3 ... 7.425
Follansbee, W. Va. W10 .. 7.425
Fontana, Calif. K1 ... 9.20
FranklinPark, Ill. T6 .. 7.525
Ind. Harbor, Ind. Y1 ... 7.425
Indianapolis S41 ... 7.575
Los Angeles C1, S41 ... 9.30
McKeesport, Pa. E10 .. 7.525
NewBedford, Mass. R10 .. 7.875
NewBritain, Conn. S15 .. 7.875
NewCastle, Pa. B4, M23 .. 7.425
NewHaven, Conn. D2 .. 7.875
NewKensington, Pa. A6 .. 7.425
Pawtucket, R.I. R3, N8 .. 7.975
Philadelphia P24 ... 7.875
Pittsburgh J5 ... 7.425
Riverdale, Ill. A1 ... 7.525
Rome, N.Y. (32) R6 ... 7.425
Sharon, Pa. S3 ... 7.425
Thenton, N.J. (31) R5 .. 8.875
Warren, O. R2, T5 ... 7.425
Worcester, Mass. A7 .. 7.975

STRIP, Cold-Rolled Alloy

Boston T6 ... 15.90
Cleveland A7 ... 15.55
Carnegie, Pa. S18 ... 15.55
Dover, O. G6 ... 15.55
Farrell, Pa. S3 ... 15.55
FranklinPark, Ill T6 .. 15.55
Harrison, N.J. S18 ... 15.55
Indianapolis S41 ... 15.70
LosAngeles S41 ... 17.75
Lowellville, O. S3 ... 15.55
Pawtucket, R.I. S8 ... 15.90
Riverdale, Ill. A1 ... 15.55
Sharon, Pa. S3 ... 15.55
Worcester, Mass. A7 ... 15.85
Youngstown S41 ... 15.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7 ... 10.80
Dearborn, Mich. S3 ... 10.80
Dover, O. G6 ... 10.80
Farrell, Pa. S3 ... 10.80
Ind. Harbor, Ind. Y1 ... 10.80
Sharon, Pa. S3 ... 10.80
Warren, O. R2 ... 10.80
Weirton, W. Va. W6 ... 10.80
Youngstown Y1 ... 10.80

STRIP, Galvanized (Continuous)

Farrell, Pa. S3 ... 7.50
Sharon, Pa. S3 ... 7.50

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Anderson, Ind. G6	9.10	....	....	....	....
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol, Conn. W1	....	10.70	12.90	16.10	19.30
Carnegie, Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn, Mich. S3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover, O. G6	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. M22	9.05	10.40	12.60	15.60	....
Farrell, Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria, O. S1	10.05	10.40	12.60	15.60	....
FranklinPark, Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison, N.J. C18	....	....	12.90	16.10	19.30
Indianapolis S41	....	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles S41	11.15	12.60	14.80	....	....
NewBritain, Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle, Pa. B4, M23	8.95	10.40	12.60	15.60	....
NewHaven, Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington, Pa. A6	8.95	10.40	12.60	15.60	....
NewYork W3	....	10.70	12.90	16.10	19.30
Pawtucket, R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale, Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome, N.Y. R6	8.95	10.40	12.60	15.60	18.55
Sharon, Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton, N.J. R5	....	10.70	12.90	15.90	18.85
Warren, O. T5	8.95	10.40	12.60	15.60	18.55
Worcester, Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)	Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol, Conn. W1	....	18.85	22.95	27.80
Buffalo W12	....	18.85	....	....
Fostoria, O. S1	....	19.05	22.15	....
FranklinPark, Ill. T6	....	19.20	23.30	28.15
Harrison, N.J. C18	....	18.85	22.95	27.80
NewYork W3	....	18.85	22.95	27.80
Palmer, Mass. W12	....	18.85	....	....
Trenton, N.J. R5	....	18.85	22.95	27.80
Worcester, Mass. A7, T6	....	18.85	22.95	27.80
Youngstown S41	....	19.20	23.30	28.15

STRIP, C.R., Electrogalvanized

Cleveland A7 ... 7.425*
Dover, O. G6 ... 7.425*
Evanston, Ill. M22 ... 7.525*
McKeesport, Pa. E10 ... 7.50*
NewCastle, Pa. M23 .. 7.425*
Riverdale, Ill. A1 ... 7.525*
Warren, O. B9, S3, T5 .. 7.425*
Worcester, Mass. A7 ... 7.975
Youngstown S41, Y1 .. 7.425*

*Plus galvanizing extras.

STRIP, Cold-Rolled Ingot Iron

Warren, O. R2 ... 8.175

TIGHT COOPERAGE HOOP

Atlanta A11 ... 5.825
Farrell, Pa. S3 ... 5.525
Riverdale, Ill. A1 ... 5.675
Sharon, Pa. S3 ... 5.525
Youngstown U5 ... 5.525

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa, Pa. J5	$9.10	$9.35	$9.75
Fairfield, Ala. T2	9.20	9.45	9.85
Fairless, Pa. U5	9.20	9.45	9.85
Fontana, Calif. K1	9.75	10.00	10.40
Gary, Ind. U5	9.10	9.35	9.75
GraniteCity, Ill. G4	9.20	9.45	9.85
IndianaHarbor, Ind. I-2, Y1	9.10	9.35	9.75
Irvin, Pa. U5	9.10	9.35	9.75
Niles, O. R2	9.10	9.35	9.75
Pittsburg, Calif. C11	9.75	10.00	10.40
SparrowsPoint, Md. B2	9.10	9.35	9.75
Weirton, W. Va. W6	9.10	9.35	9.75
Yorkville, O. W10	9.10	9.35	9.75

ELECTROLYTIC TIN-COATED SHEET (Dollars per 100 lb)

Aliquippa, Pa. J5 (21-27 Ga.)	7.90	8.10	....
IndianaHarbor, Ind. Y1 (20-27 Ga.)	7.90	....	....
Niles, O. R2 (20-27 Ga.)	7.90	8.10	8.30

ELECTROLYTIC THIN TIN PLATE (¼ lb coating in coils)

	Base Box 45 lb	50 lb	55 lb	60 lb
Fairfield, Ala. T2	$6.20	$6.35	$6.50	$6.65
Fairless, Pa. U5	6.20	6.35	6.50	6.65
Gary, Ind. U5	6.10	6.25	6.40	6.55
Irvin, Pa. U5	6.10	6.25	6.40	6.55
SparrowsPoint, Md. B2	6.10	6.25	6.40	6.55
Weirton, W. Va. W6	6.10	6.25	6.40	6.55

TIN PLATE, Hot Dipped 1.25 lb Common Coke	1.50 lb
Aliquippa, Pa. J5	$10.40	$10.65
Fairfield, Ala. T2	10.50	10.75
Fontana, Calif. K1	11.05	11.30
Gary, Ind. U5	10.40	10.65
Irvin, Pa. U5	10.40	10.65
Pitts., Calif. C11	11.05	11.30
Sp. Pt., Md. B2	10.40	10.65
Weirton, W. Va. W6	10.40	10.65
Yorkville, O. W10	10.40	10.65

BLACK PLATE (Base Box)

Aliquippa, Pa. J5	$8.20
Fairfield, Ala. T2	8.30
Fairless, Pa. U5	8.30
Fontana, Calif. K1	8.85
GraniteCity, Ill. G4	8.30
Ind. Harbor, Ind. I-2, Y1	8.20
Irvin, Pa. U5	8.20
Niles, O. R2	8.20
Pittsburg, Calif. C11	8.85
SparrowsPoint, Md. B2	8.20
Weirton, W. Va. W6	8.20
Yorkville, O. W10	8.20

HOLLOWARE ENAMELING (Black Plate) (29 Gage)

Aliquippa, Pa. J5	7.85
Gary, Ind. U5	7.85
GraniteCity, Ill. G4	7.95
Ind. Harbor, Ind. Y1	7.85
Irvin, Pa. U5	7.85
Yorkville, O. W10	7.85

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom, W. Va. W10	....	11.70	12.40	13.35	14.65
Brackenridge, Pa. A4	....	....	12.40	13.55	14.65
GraniteCity, Ill. G4	9.975*	11.30*	12.00*	13.15*	....
IndianaHarbor, Ind. I-2	9.875*	11.20*	11.90*	13.05*	....
Mansfield, O. E6	9.875*	11.70	12.40	13.55	14.65
Newport, Ky. A2	9.875	11.70*	12.40*	13.55*	14.65*
Niles, O. M21	9.875*	11.70	12.40	13.55	....
Vandergrift, Pa. U5	9.875*	11.70	12.40	13.55	14.65
Warren, O. R2	9.875*	11.70	12.40	13.55	14.65
Zanesville, O. A10	....	11.70†	12.40	13.55	14.65

	Stator
Mansfield, O. E6	8.10
Vandergrift, Pa. U5	8.10
Warren, O. R2 (Locore)	8.10

SHEETS (22 Ga., coils & cut lengths)

Fully Processed (Semiprocessed ½c lower)	T-72	T-65	T-58	T-52
BeechBottom, W. Va. W10	15.70	16.30	16.80	17.85
Zanesville, O. A10	15.70	16.30	16.80	17.85
Vandergrift, Pa. U5	15.70	16.30	16.80	17.85

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge, Pa. A4	....	18.10	19.70	20.20	20.70	15.70††
Butler, Pa. A10	....	....	19.70	20.20	20.70	....
Vandergrift, Pa. U5	17.10	18.10	19.70	20.20	20.70	15.70
Warren, O. R2	....	....	....	....	....	15.70‡

*Semiprocessed. †Fully processed only. ‡Coil annealed; semiprocessed ½c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity, Ala. R2 ... 8.00
Aliquippa, Pa. J5 ... 8.00
Alton, Ill. L1 ... 8.20
Atlanta A1 ... 8.00
Bartonville, Ill. K4 ... 8.10
Buffalo W12 ... 8.00
Chicago W13 ... 8.00
Cleveland A7, C20 ... 8.00
Crawfordsville, Ind. M8 .. 8.10
Donora, Pa. A7 ... 8.00
Duluth A7 ... 8.00
Fairfield, Ala. T2 ... 8.00
Fostoria, O. (24) S1 ... 8.10
Houston S5 ... 8.25
Jacksonville, Fla. M8 ... 8.35
Johnstown, Pa. B2 ... 8.00
Joliet, Ill. A7 ... 8.00
KansasCity, Mo. S5 ... 8.25
Kokomo, Ind. C16 ... 8.10
LosAngeles B3 ... 8.95
Minnequa, Colo. C10 ... 8.25
Monessen, Pa. P7, P16 .. 8.00
Palmer, Mass. W12 ... 8.30
Pittsburg, Calif. C11 ... 8.95
Portsmouth, O. P12 ... 8.00
S. Chicago, Ill. R2 ... 8.00
S. SanFrancisco C10 ... 8.95
SparrowsPoint, Md. B2 .. 8.10
Sterling, Ill. (1) N15 ... 8.00
Sterling, Ill. N15 ... 8.10
Struthers, O. Y1 ... 8.00
Waukegan, Ill. A7 ... 8.00
Worcester, Mass. A7 ... 8.30

WIRE, Cold Heading Carbon

Elyria, O. W8 ... 8.00

WIRE, Gal'd., for ACSR

Bartonville, Ill. K4 ... 12.65
Buffalo W12 ... 13.40
Cleveland A7 ... 12.65
Donora, Pa. A7 ... 12.65
Duluth A7 ... 12.65
Johnstown, Pa. (10) B2 .. 12.65
KansasCity, Mo. U3 ... 12.90
LosAngeles (2) B3 ... 13.60
Minnequa, Colo. C10 .. 12.775
Monessen, Pa. P7, P16 .. 12.65
Muncie, Ind. I-7 ... 13.60
NewHaven, Conn. A7 .. 12.95
Palmer, Mass. W12 ... 13.70
Pittsburg, Calif. C11 ... 13.45
Portsmouth, O. P12 ... 12.65
Roebling, N.J. R5 ... 12.95
SparrowsPt., Md. (10) B2 12.75
Struthers, O. Y1 ... 13.40
Trenton, N.J. A7 ... 12.95
Waukegan, Ill. A7 ... 12.65
Worcester, Mass. A7 ... 12.95

WIRE, Upholstery Spring

Aliquippa, Pa. J5 ... 9.75
Alton, Ill. L1 ... 9.95
Buffalo W12 ... 9.75
Cleveland A7 ... 9.75
Donora, Pa. A7 ... 9.75
Duluth A7 ... 9.75
Johnstown, Pa. B2 ... 9.75
KansasCity, Mo. S5, U3 .. 10.00
Kokomo, Ind. C16 ... 9.85
LosAngeles B3 ... 10.70
Minnequa, Colo. C10 ... 9.95
Monessen, Pa. P7, P16 .. 9.75
NewHaven, Conn. A7 ... 10.05
Palmer, Mass. W12 ... 10.05
Pittsburg, Calif. C11 ... 10.70
Portsmouth, O. P12 ... 9.75
Roebling, N.J. R5 ... 10.05
S. Chicago, Ill. R2 ... 9.75
S. SanFrancisco C10 ... 10.70
SparrowsPt., Md. B2 ... 9.85
Struthers, O. Y1 ... 9.75
Trenton, N.J. A7 ... 10.05
Waukegan, Ill. A7 ... 9.75
Worcester, Mass. A7 ... 10.05

WIRE, MB Spring, High-Carbon

Aliquippa, Pa. J5 ... 9.75
Alton, Ill. L1 ... 9.95
Bartonville, Ill. K4 ... 9.85
Buffalo W12 ... 9.75
Cleveland A7 ... 9.75
Donora, Pa. A7 ... 9.75
Duluth A7 ... 9.75
Fostoria, O. S1 ... 9.80
Johnstown, Pa. B2 ... 9.75
KansasCity, Mo. S5, U3 .. 10.00
LosAngeles B3 ... 10.70
Milbury, Mass. (12) N6 .. 10.05
Minnequa, Colo. C10 ... 9.95
Monessen, Pa. P7, P16 .. 9.75
Muncie, Ind. I-7 ... 9.95
Palmer, Mass. W12 ... 10.05
Pittsburg, Calif. C11 ... 10.70
Portsmouth, O. P12 ... 9.75
Roebling, N.J. R5 ... 10.05
S. Chicago, Ill. R2 ... 9.75
S. SanFrancisco C10 ... 10.70
SparrowsPt., Md. B2 ... 9.85
Struthers, O. Y1 ... 9.75
Trenton, N.J. A7 ... 10.05
Waukegan, Ill. A7 ... 9.75
Wor'ster, Mass. A7, J4, T6 10.05

WIRE, Fine & Weaving (8" Coils)

Alton, Ill. L1 ... 16.50
Bartonville, Ill. K4 ... 16.40
Chicago W13 ... 16.30
Cleveland A7 ... 16.30
Crawfordsville, Ind. M8 .. 16.40
Fostoria, O. S1 ... 16.30
Houston S5 ... 16.55
Jacksonville, Fla. M8 ... 16.65
Johnstown, Pa. B2 ... 16.30
KansasCity, Mo. S5 ... 16.55
Kokomo, Ind. C16 ... 16.30
Minnequa, Colo. C16 ... 16.55
Monessen, Pa. P16 ... 16.30
Muncie, Ind. I-7 ... 16.50
Palmer, Mass. W12 ... 16.60
S. SanFrancisco C10 ... 17.15
Waukegan, Ill. A7 ... 16.30
Worcester, Mass. A7, J6 .. 16.60

ROPE WIRE (A)

Bartonville, Ill. K4 ... 13.45
Buffalo W12 ... 13.45
Fostoria, O. S1 ... 13.45
Johnstown, Pa. B2 ... 13.45
Monessen, Pa. P7 ... 13.45
Muncie, Ind. I-7 ... 13.65
Palmer, Mass. W12 ... 13.75
Portsmouth, O. P12 ... 13.45
Roebling, N.J. R5 ... 13.75
St. Louis L8 ... 13.45
SparrowsPt., Md. B2 .. 13.55
Struthers, O. Y1 ... 13.45
Worcester, Mass. J4 ... 13.75

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

Sharp-shouldered Bolt for a Precision Fit Made from KEYSTONE WIRE

Quality Fasteners, Inc., Kalamazoo, Michigan, serves many markets with its heading specialties. One such specialty is a D-shoulder bolt for a supermarket food cart caster, designed so it will key into the caster structure. This bolt is headed from annealed-in-process Keystone Heading Wire with Lime Brite finish. Quality Fasteners, Inc. heads this specialty without a relief attachment.

Chester Werme, veteran cold-header, President of Quality Fasteners, knows his wire. He buys Keystone Wire for all his forming operations, because, as he says, "We know what this wire will do and we design our products around it."

At Quality Fasteners, flowability of Keystone Wire is the secret which assures uniform quality, sharp shoulders and edges, correct tolerances with accurate dimensions. The result: Considerable savings and a better product over other machining techniques.

So, when you contemplate forming a product from wire, remember the superior flowability characteristics of Keystone Wire. Our Wire Specialists are always ready to consult with you about your wire forming problems. We invite you to call or write.

Keystone Steel & Wire Company, Peoria, Illinois

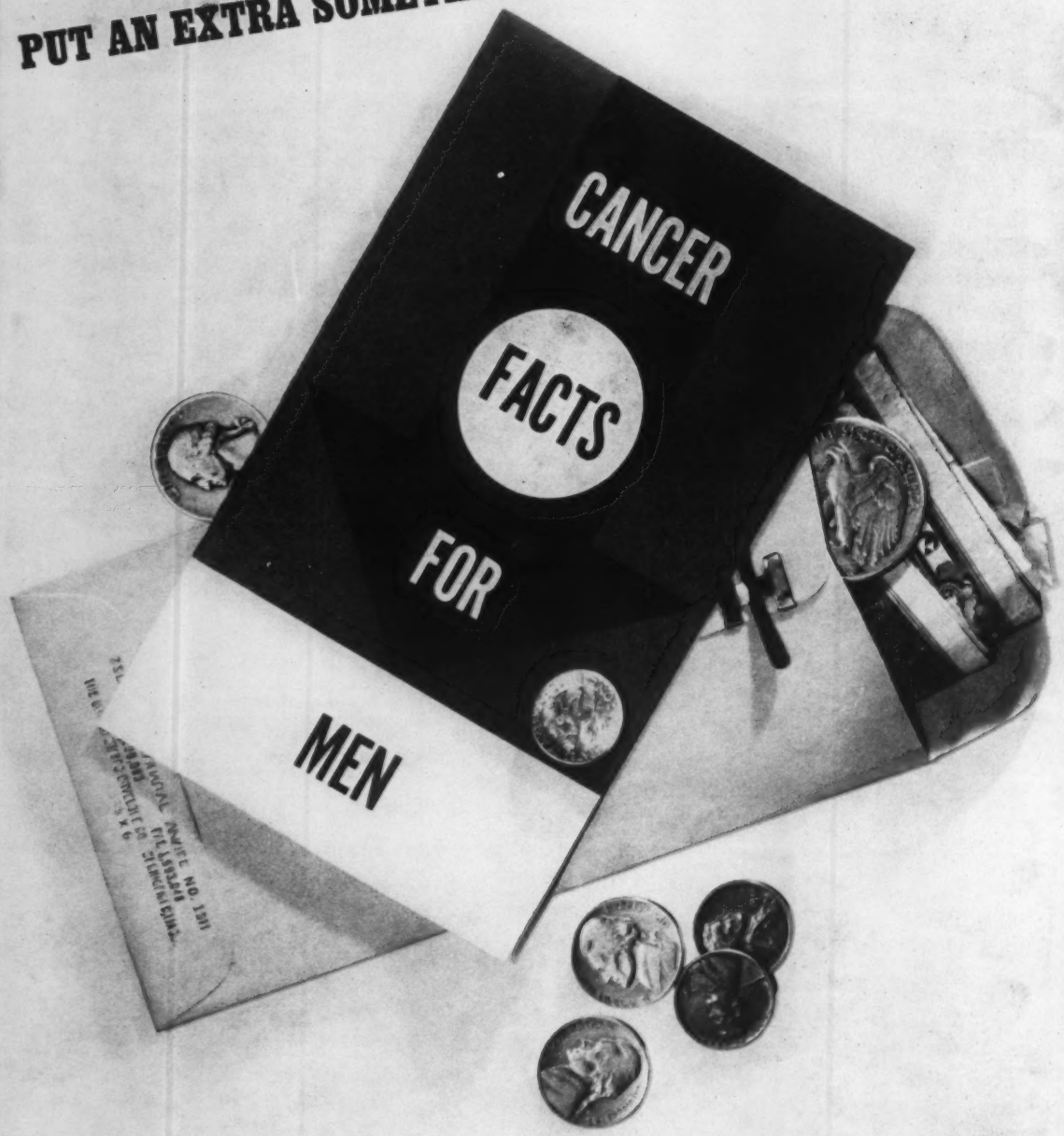
KEYSTONE COLD HEADING WIRE STUDY

KEYSTONE

WIRE FOR INDUSTRY

MANUFACTURED AT PEORIA, ILLINOIS, U. S. A.

PUT AN EXTRA SOMETHING IN THEIR PAY ENVELOPES



It could be the biggest bonus you ever gave your employees—life-saving facts about cancer. Whether you have a factory or an office—a hundred or a thousand employees—we are prepared to offer a cancer education program to meet your particular requirements. Pamphlets, posters, films and speakers will bring vital information to your employees. Such programs pay off in saving lives. Call your local American Cancer Society for further information. Do it today.

American Cancer Society®

WIRE, Tire Bead

Bartonville,Ill. K4	17.15
Monessen,Pa. P16	17.15
Roebling,N.J. R5	17.65

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	12.35
Baltimore T6	12.65
Boston T6	12.65
Buffalo W12	12.35
Chicago W13	12.45
Cleveland A7	12.35
Crawfordsville,Ind. M8	12.35
Dover,O. G6	12.35
Evanston,Ill. M22	12.45
Farrell,Pa. S3	12.35
Fostoria,O. S1	12.35
FranklinPark,Ill. T6	12.45
Kokomo,Ind. C16	12.35
Massillon,O. R8	12.35
Milwaukee C23	12.55
Monessen,Pa. P7, P16	12.35
NewCastle,Pa. M23	12.35
Palmer,Mass. W12	12.65
Pawtucket,R.I. N8	12.65
Philadelphia P24	12.65
Riverdale,Ill. A1	12.45
Rome,N.Y. R6	12.35
Sharon,Pa. S3	12.35
Trenton,N.J. R5	12.65
Warren,O. B9	12.35
Worcester,Mass. A7, T6	12.65

NAILS, Stock Sizes

	Col.
AlabamaCity,Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	173
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla. M8	175
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

(To Wholesalers: per cwt)

Galveston,Tex. D7	$10.30

NAILS, CUT (100 lb kegs)

Wheeling,W.Va. W10	$10.10

POLISHED STAPLES

	Col.
AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	173
Atlanta A11	173
Bartonville,Ill. K4	175
Crawfordsville,Ind. M8	177
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	180
Jacksonville,Fla. M8	177
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa,Colo. C10	178
Pittsburg,Calif. C11	194
Rankin,Pa. A7	173
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

TIE WIRE, Automatic Baler (14½ Ga.) (per 97 lb Net Box) Coil No. 3150

AlabamaCity,Ala. R2	$8.78
Atlanta A11	10.36
Bartonville,Ill. K4	8.88
Buffalo W12	10.26
Chicago W13	9.24
Crawfordsville,Ind. M8	8.88
Donora,Pa. A7	8.78
Duluth A7	8.78
Fairfield,Ala. T2	8.78
Houston S5	10.51
Jacksonville,Fla. M8	8.88
Johnstown,Pa. B2	8.78
Joliet,Ill. A7	8.78
KansasCity,Mo. S5	10.51
Kokomo,Ind. C16	8.88
LosAngeles B3	9.44
Minnequa,Colo. C10	9.02
Pittsburg,Calif. C11	9.44
S.Chicago,Ill. R2	8.78
S.SanFrancisco C10	9.94
SparrowsPt., Md. B2	8.88
Sterling,Ill.(37) N15	8.88

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$9.06
Atlanta A11	10.70
Bartonville,Ill. K4	9.16
Buffalo W12	10.60
Chicago W13	9.54
Crawfordsville,Ind. M8	9.16
Donora,Pa. A7	9.06
Duluth A7	9.06
Fairfield,Ala. T2	9.06
Houston S5	10.85
Jacksonville,Fla. M8	9.16
Johnstown,Pa. B2	9.06
Joliet,Ill. A7	9.06
KansasCity,Mo. S5	10.85
Kokomo,Ind. C16	9.16
LosAngeles B3	9.75
Minnequa,Colo. C10	9.30
Pittsburg,Calif. C11	9.75
S.Chicago,Ill. R2	9.06
S.SanFrancisco C10	10.26
SparrowsPt.,Md. B2	9.16
Sterling,Ill.(37) N15	9.16

Coil No. 6500 Interim

AlabamaCity,Ala. R2	$9.11
Atlanta A11	10.75
Bartonville,Ill. K4	9.21
Buffalo W12	10.65
Chicago W13	9.59
Crawfordsville,Ind. M8	9.21
Donora,Pa. A7	9.11
Duluth A7	9.11
Fairfield,Ala. T2	9.11
Houston S5	10.90
Jacksonville,Fla. M8	9.21
Johnstown,Pa. B2	9.11
Joliet,Ill. A7	9.11
KansasCity,Mo. S5	10.96
Kokomo,Ind. C16	9.21
LosAngeles B3	9.80
Minnequa,Colo. C10	9.35
Pittsburg,Calif. C11	9.80
S.Chicago,Ill. R2	9.11
S.SanFrancisco C10	10.31
SparrowsPt.,Md. B2	9.21
Sterling,Ill.(37) N15	9.21

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	212
Atlanta A11	212
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
SparrowsPt.,Md. B2	214
Sterling,Ill.(7) N15	214

FENCE POSTS

	Col.
Birmingham C15	177
ChicagoHts.,Ill. C2, I-2	177
Duluth A7	177
Franklin,Pa. F5	177
Johnstown,Pa. B2	177
Marion,O. P11	177
Minnequa,Colo. C10	182
Tonawanda,N.Y. B12	177

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	193**
Aliquippa,Pa. J5	190§
Atlanta A11	197*
Bartonville,Ill. K4	199
Crawfordsville,Ind. M8	198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193†
Houston S5	198**
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	196§
Joliet,Ill. A7	193†
KansasCity,Mo. S5	198**
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198**
Monessen,Pa. P7	196§
Pittsburg,Calif. C11	213†
Rankin,Pa. A7	193†
S.Chicago,Ill. R2	193**
SparrowsPoint,Md. B2	198§
Sterling,Ill.(7) N15	198

WIRE (16 gage)

	An'ld Stone	Galv. Stone
Ala.City,Ala.R2	17.85	19.40**
Ali'ppa,Pa. J5	17.85	19.65
Bartonville K4	17.95	19.80
Chicago W13	17.85	—
Cleveland A7	17.85	—
Craw'sville M8	17.95	19.80†‡
Fostoria,O. S1	18.35	19.90†
Houston S5	18.10	19.65**
Jacksonville M8	18.95	19.80†‡
Johnstown B2	17.85	19.65§
Kan.City,Mo. S5	18.10	—
Kokomo C16	17.95	19.50†
Minnequa C10	18.10	19.65**
P'im'r,Mass. W12	18.15	19.70†
Pitts.,Calif. C11	18.20	19.75†
S.SanFran. C10	18.20	19.75**
St'ling(37) N15	17.95	19.80
SparrowsPt. B2	17.95	19.75§
Waukegan A7	17.85	19.40†
Worcester A7	18.15	—

WOVEN FENCE, 9-15 Ga.

	Col.
Ala.City,Ala. R2	187**
Aliq'ppa,Pa.9-11½ga.J5	190§
Atlanta A11	191*
Bartonville,Ill. K4	193
Crawfordsville,Ind. M8	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston S5	192**
Jacksonville,Fla. M8	192
Johnstown,Pa.(42) B2	190§
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192**
Pittsburg,Calif. C11	210†
Rankin,Pa. A1	187†
S.Chicago,Ill. R2	187**
Sterling,Ill.(7) N15	192

WIRE, Merchant Quality

(6 to 8 gage)	An'ld	Galv.
Ala.City,Ala. R2	9.00	9.55**
Aliquippa J5	8.65	9.325§
Atlanta (48) A11	9.00	9.75*
Bartonville(48)K4	9.85	19.90
Buffalo W12	9.00	9.55†
Chicago W13	9.00	9.55**
Cleveland A7	9.00	—
Crawfordsville M8	9.10	9.80††
Donora,Pa. A7	9.00	9.55†
Duluth A7	9.00	9.55†
Fairfield T2	9.00	9.55†
Houston(48) S5	9.25	9.80**
Jack'ville,Fla. M8	9.10	9.80‡‡
Johnstown(48) B2	9.00	9.675§
Joliet,Ill. A7	9.00	9.55†
KansasCity(48)S5	9.25	9.80**
Kokomo(48) S16	9.10	9.65†
LosAngeles B3	9.95	10.625§
Minnequa C10	9.25	9.80**
Monessen(48) P7	8.65	9.35§
Palmer,Mass. W12	9.30	9.85†
Pitts.,Calif. C11	9.95	10.50†
Rankin,Pa. A7	9.00	9.55†
S.Chicago R2	9.00	9.55**
S.SanFran. C10	9.95	10.50**
Spar'wsPt.(48)B2	9.10	9.775§
St'ling(37)(48)N15	9.10	9.80
Struthers,O. Y1	9.00	9.65‡
Worcester,Mass.A7	9.30	9.85†

Based on zinc prices of: *13.50c. †5c. §10c. ‡Less than 10c. ††10.50c. ‡‡11.00c. **Subject to zinc equalization extras.

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ½ in., larger 12.85
7/16 in. and smaller by 6 in. and shorter: 15% off list.

FASTENERS

(Consumer discounts per cent off list prices, orders for 1 container for assorted sizes; for less than container quantities, add 25 per cent; attaching nuts to bolts, package sizes, add 7.5 per cent; heavy hex nut 1⅛ in. through 1½ in. tapped 8 threads, add 10 per cent)

HEX HEAD CAP SCREWS, coarse, or fine thread, packaged or bulk, with or without hex nuts, 1020 steel bright and high carbon heat treated, ¼ in. thru 1 in. diam., listed lengths:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
Bulk	50

BOLTS, Standard stock sizes:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
*Bulk	50

*Hot galvanized or zinc plated lag bolts only — for package or bulk quantities use applicable list less bulk discounts.

CAP AND SETSCREWS,

Fillister Head, Cap Screws, Coarse Thread:

Packaged	+55
Bulk	+16

Flat Head Cap Screws: ¾ in. and smaller, 6 in. and shorter:

Packaged	+85
Bulk	+38

Setscrews, Square Head, Cup Point, Coarse Thread: Through 1 in. diam., 6 in. and shorter:

Packaged	+ 5
Bulk	19

Through 1 in. diam., longer than 6 in.:

Packaged	+29

HEXAGON NUTS: American Standard: Finished hex, hex jam, and hex slotted coarse or fine thread, ¼ in. through 3 in., finished hex thick, thick and slotted, castle, fine thread, ¼ in. through 1½ in., semifinished hex heavy, heavy and jam, heavy and slotted, coarse thread, ¼ in. through 4 in., and

SQUARE NUTS, American Standard: Regular square and heavy square, coarse thread, ¼ in. through 2 in.:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
Bulk	50

PRESTRESSED STRAND

(High strength, stress relieved; 7 wire uncoated. Net prices per 1000 ft, 40,000 lb and over)

	Standard Diameter, Inches				
	1/4	5/16	3/8	7/16	1/2
Buffalo W12	$26.20	$38.50	$47.90	$61.30	$80.30
KansasCity,Mo. U3	26.20	38.50	47.90	61.30	80.30
Minnequa,Colo. C10	26.20	38.50	47.90	61.30	80.30
Pittsburg,Calif. C11	26.20	38.50	47.90	61.30	80.30
Roebling,N.J. R5	26.20	38.50	47.90	61.30	80.30
SparrowsPoint,Md. B2	26.20	38.50	47.90	61.30	80.30
St.Louis L8	26.20	38.50	47.90	61.30	80.30
Waukegan,Ill. A7	26.20	38.50	47.90	61.30	80.30

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut length 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	27.24	23.13
1¼	13	....	32.25	24.41
1½	13	30.42	35.65	26.98
1¾	13	35.94	42.12	31.89
2	13	40.28	47.21	35.74
2¼	13	45.36	58.17	40.26
2½	12	49.24	57.72	43.70
2¾	12	54.23	63.57	48.13
2¾	12	58.73	68.83	52.13
3	12	62.62	73.40	55.59

RAILWAY MATERIALS

Rails	Standard No. 1	Standard No. 2	Standard All No. 2	Toe Rails 60 lb Under
Bessemer,Pa. U5	5.75	5.65	....	6.725
Ensley,Ala. T2	5.75	5.65	....	6.725
Fairfield,Ala. T2	....	....	....	6.725
Gary,Ind. U5	5.75	5.65	....	....
Huntington,W.Va. C15	....	....	....	6.725
Johnstown,Pa. B2	....	....	....	(16)6.725
Lackawanna,N.Y. B2	5.75	5.65	....	6.725
Minnequa,Colo. C10	5.75	5.65	....	7.225
Steelton,Pa. B2	5.75	5.65	....	....
Williamsport,Pa. S19	....	....	....	6.725

TIE PLATES

Fairfield,Ala. T2	6.875
Gary,Ind. U5	6.875
Lackawanna,N.Y. B2	6.875
Minnequa,Colo. C10	6.875
Seattle B3	7.025
Steelton,Pa. B2	6.875
Torrance,Calif. C11	7.025

JOINT BARS

Bessemer,Pa. U5	7.25
Fairfield,Ala. T2	7.25
Joliet,Ill. U5	7.25
Lackawanna,N.Y. B2	7.25
Minnequa,Colo. C10	7.25
Steelton,Pa. B2	7.25

AXLES

Ind.Harbor,Ind. S13	9.125
Johnstown,Pa. B2	9.125

SCREW SPIKES

Lebanon,Pa. B2	15.10

TRACK BOLTS, Untreated

Cleveland R2	15.35
KansasCity,Mo. S5	15.35
Lebanon,Pa. B2	15.35
Minnequa,Colo. C10	15.35
Pittsburgh S44	15.35
Seattle B3	15.85

STANDARD TRACK SPIKES

Fairfield,Ala. T2	10.10
Ind.Harbor,Ind. I-2, Y1	10.10
KansasCity,Mo. S5	10.10
Lebanon,Pa. B2	10.10
Minnequa,Colo. C10	10.10
Pittsburgh J5	10.10
Seattle B3	10.60
S.Chicago,Ill. R2	10.10
Struthers,O. Y1	10.10
Youngstown R2	10.10

Footnotes

(1) Chicago base.
(2) Double galvanized.
(3) Merchant.
(4) Reinforcing.
(5) 1½ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in.; 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Limited analyses only.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Bethany A coating.
(12) Worcester, Mass., base.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Deld. in mill zone, 5.65c.
(27) Bar mill sizes.
(28) Bonderized.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.375c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) 14 Ga., 48 in.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 13 Ga. & lighter; 60" & narrower.
(39) 48" and narrower.
(47) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds and 2½ in. and smaller hexagons; 9.65c for larger rounds and hexagons and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Youngstown Y1	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

ELECTRICWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Alton, Ill. L1	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Benwood, W. Va. W10	1.5	+27	+10.5	+36	+21	+45.5	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Butler, Pa. F6	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+28	+7.75	+24	+4.25	+19.5	+1.75	+18.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+16	4.25	+12	7.75	+7.5	10.25	+6.25
Lorain, O. N3	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sharon, Pa. S4	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sparrows Pt., Md. B2	2.5	+26	+10.5	+36	+21.5	+46	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Wheatland, Pa. W9	4.5	+24	+8.5	+34	+19.5	+44	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.75		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Alton, Ill. L1	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Benwood, W. Va. W10	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Etna, Pa. N2	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Fairless, Pa. N3	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Fontana, Calif. K1	+1.25	+17.25	+0.75	+16.75	0.75	+16.5	0.75	+16.5	+9.75	+27.5	+9.75	+27.5
Indiana Harbor, Ind. Y1	10.75	+5.25	11.25	+4.75	12.75	+4.5	12.75	+4.5	2.25	+15.5	2.25	+15.5
Lorain, O. N3	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sharon, Pa. M6	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sparrows Pt., Md. B2	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Wheatland, Pa. W9	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Youngstown R2, Y1	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5

*Galvanized pipe discounts based on price of zinc at 12.00c, East St. Louis.

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	Rerolling: Ingot	Rerolling: Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.75	25.00	....	36.00	....	43.50	39.25	48.50	45.00
202	24.75	28.25	37.75	39.00	42.25	44.50	40.00	49.25	49.25
301	24.00	26.00	38.75	37.25	43.50	46.00	41.25	51.25	47.50
302	26.25	29.50	39.50	40.50	44.25	46.75	42.25	52.00	52.00
302B	26.50	30.75	42.25	45.75	46.75	49.00	44.50	57.00	57.00
303	....	33.25	42.50	....	47.25	49.75	45.00	56.75	56.75
304	28.00	29.50	39.50	40.50	44.25	46.75	45.75	52.00	52.00
304L	....	37.25	47.25	48.25	52.00	54.50	53.50	59.75	59.75
305	29.50	34.75	44.00	47.50	47.00	49.50	46.25	58.75	58.75
308	32.00	36.25	49.00	50.25	54.75	57.75	55.25	63.00	63.00
309	41.25	47.50	60.00	64.50	66.25	69.50	66.00	80.50	80.50
310	51.50	59.50	81.00	84.25	89.75	94.50	87.75	96.75	96.75
314	....	....	80.50	....	89.75	94.50	87.75	....	104.25
316	41.25	47.50	64.50	68.50	71.75	75.75	71.75	80.75	80.75
316L	....	55.25	72.25	76.25	79.50	83.50	79.50	88.50	88.50
317	49.75	58.00	79.75	88.25	89.50	94.25	88.50	101.00	101.00
321	33.50	38.00	48.75	53.50	54.50	57.50	54.75	65.50	65.50
330	....	....	123.25	....	98.75	143.75	135.00	149.25	149.25
18-8 CbTa	38.50	48.25	57.75	63.50	63.75	67.25	64.75	79.25	79.25
403	....	....	29.25	....	33.25	35.00	30.00	40.25	40.25
405	20.25	26.50	30.75	36.00	34.75	36.50	32.50	46.75	46.75
410	17.50	19.50	29.25	31.00	33.25	35.00	30.00	40.25	40.25
416	....	....	29.75	....	33.75	35.50	31.25	48.25	48.25
420	....	31.50	35.50	41.75	40.75	42.75	40.25	62.00	62.00
430	17.75	19.75	29.75	32.00	33.75	35.50	31.00	40.75	40.75
430F	....	....	30.50	....	34.25	36.00	31.75	51.75	51.75
431	....	29.75	39.25	....	43.50	46.00	41.00	56.00	56.00
446	....	....	40.75	59.00	46.00	48.25	42.75	70.00	70.00

Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; Calstrip Steel Corp.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Somers Brass Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steel Inc.; Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Steel Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary of Allegheny Ludlum Steel Corp.; Washington Steel Corp.; Seymour Mfg. Co.

Clad Steel

	Plates: Carbon Base 5%	10%	15%	20%	Sheets: Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	26.05	28.80	31.55	34.30	39.75
304L	30.50	33.75	36.95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60.40	65.65	....
321	31.20	34.50	37.75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	49.80	61.35	72.80	84.40	....
Nickel	43.20	55.05	66.95	78.90	....
Nickel, Low Carbon	43.50	55.70	67.95	80.35	....
Monel	44.25	55.35	66.45	77.60	....

	Strip, Carbon Base—Cold Rolled— 10%	Both Sides
Copper*	38.10	43.00

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. P4; Coatesville, Pa. L7; New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	Hi-Carbon-Cr (D-11)	0.955
Spec. Carbon (W-1)	0.385	V-Cr Hot Work (H-13)	0.550
Oil Hardening (O-1)	0.505	W-Cr Hot Work (H-12)	0.530
V-Cr Hot Work (H-11)	0.505	W Hot Wk (H-21)	1.425-1.44

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	...	T-1	1.840
18	4	2	....	...	T-2	2.005
13.5	4	3	....	...	T-3	2.105
18.25	4.25	1	4.75	...	T-4	2.545
18	4	2	9	...	T-5	2.915
20.25	4.25	1.6	12.95	...	T-6	4.330
13.75	3.75	2	5	...	T-8	2.485
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B8, C4, C9, C12, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

Prices in dollars per gross ton, f.o.b. (rail) furnace; add 50 cents when shipped by truck. Maximum delivered prices are approximate and based on rail shipment.

Birmingham District	Basic	No. 2 Foundry	Malle-able	Besse-mer
Birmingham R2	62.00	62.50**	66.50	....
Birmingham U6	....	62.50**	66.50	....
Woodward, Ala. W15	62.00*	62.50**	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N. Tonawanda, N.Y. T9	....	66.50	67.00	67.50
Tonawanda, N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester, N.Y., deld.	69.02	69.52	70.02	....
Syracuse, N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S. Chicago R2	66.00	66.50	66.50	67.00
S. Chicago, Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	68.81	69.31	69.31	69.81
Muskegon, Mich., deld.	....	74.46	74.46	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron, Ohio, deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro, Pa. B10	68.00	68.50	69.00	69.50
Chester, Pa. P4	Nom.	Nom.	Nom.	....
Swedeland, Pa. A3	68.00	68.50	69.00	69.50
NewYork, deld.	....	75.41	75.91	....
Newark, N.J., deld.	72.53	73.03	73.53	74.03
Philadelphia, deld.	70.18	70.68	71.18	71.68
Troy, N.Y., R2	68.00	68.50	69.00	69.50
Boston, deld.	75.20	75.70	76.20	76.70
Pittsburgh District				
Neville Island, Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), deld.	....	68.31	68.31	68.81
Monaca, Pa., deld.	....	68.33	68.33	68.83
Lawrenceville, W. Homestead, Wilmerding, Pa., deld.	....	68.68	68.68	69.18
Verona, Trafford, Pa., deld.	68.83	69.33	69.33	69.83
Brackenridge, Pa., deld.	69.16	69.66	69.66	70.16
Midland, Pa. C15	66.00	....	....	....
Youngstown District				
Hubbard, Ohio Y1	....	....	66.50	....
Sharpsville, Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	....

Other U. S. Districts	Basic	No. 2 Foundry	Malle-able	Besse-mer
Duluth I-3	66.00	66.50	66.50	67.00
Erie, Pa. I-3	66.00	66.50	66.50	67.00
Fontana, Calif. K1	75.00	75.50	....	....
Geneva, Utah C11	66.00	66.50	....	....
GraniteCity, Ill. G4	67.90	68.40	68.90	....
Ironton, Utah C11	66.00	66.50	....	....
Minnequa, Colo. C10	68.00	68.50	69.00	....
Rockwood, Tenn. T3	62.00	62.50‡	66.50	67.00
Toledo, Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....
Mansfield, Ohio, deld.	....	....	71.34	....
Canadian District				
Hamilton, Ont. S46	65.00	65.00	65.50	....
PortColborne, Ont. A25	65.00	65.00	65.50	66.00
SaultSte. Marie, Ont. A25	65.00	65.00	65.50	66.00

*Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.
‡Phos. 0.50% up; Phos. 0.30-0.49%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% silicon; add 75c for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 13%; starting with silicon over 13% add $1 per ton for each 0.50% silicon or portion thereof up to 14%; over 14%, price is $93 with $1 differential; add $1 for each 0.50% Mn over 1%)

Buffalo H1	$79.25
Jackson, Ohio I-3, J1	78.00
PortColborne, Ont. A25	78.50
Toledo, Ohio I-3	78.00

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

CalvertCity, Ky. P15	$99.00
NiagaraFalls, N.Y. P15	99.00
Keokuk, Iowa Open-hearth & Fdry. K2	89.00
Keokuk, Iowa O.H. & Fdry. 12½ lb piglets, 16% Si, K2	92.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Birdsboro, Pa. B10 (Phos. 0.075% max)	$73.00
Lyles, Tenn. T3 (Phos. 0.035% max)	73.00
Rockwood, Tenn. T3 (Phos. 0.035% max)	73.00
Buffalo H1 (Intermediate) (0.036-0.075% max)	71.50
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Erie, Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
NevilleIsland, Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Swedeland, Pa. A3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Troy, N.Y. R2 (Phos. 0.075% max)	73.00

Steel Service Center Products

Representative prices, cents per pound, f.o.b. warehouse, for 2000 lb items (except stainless) ordered by themselves. Prices will vary with total weight of the order or weight of the individual items or both. Base quantities for stainless sheets: 8000 lb, except in Chicago, New York, Boston, Los Angeles, and San Francisco, 10,000 lb. City delivery charges are 15 cents per 100 lb except: Denver, 20 cents; Baltimore, Boston, New York, Philadelphia, San Francisco, 10 cents; Atlanta, Birmingham, Dallas, Houston, Los Angeles, Seattle, no charge.

	SHEETS				STRIP	BARS			STRUCTURAL	PLATES	
	Hot Rolled	Cold Rolled	Galv.	Stainless Type 302	Hot Rolled	H.R. Rounds	C.F. Rounds	H.R. Alloy 4140	SHAPES	Carbon	Floor
Atlanta	9.37	10.61	11.83	....	10.85	9.53	13.24	....	9.94	9.73	11.16
Baltimore	7.77	9.61	10.06	....	10.18	8.55	11.70	16.38	9.03	8.34	10.02
Birmingham	9.43	10.20	10.46	....	10.41	8.26	13.14	16.76	8.47	8.41	10.05
Boston	9.67	10.58	11.77	53.50	12.16	9.77	13.35	16.59	10.16	9.62	11.08
Buffalo	8.55	9.30	11.25	55.98	11.00	8.75	11.45	16.30	9.15	8.65	11.10
Charlotte, N. C.	9.87	11.22	10.30	....	10.86	9.67	12.68	....	9.88	9.82	11.46
Chicago	8.57	10.20	10.15	52.00	10.74	8.55	10.65	15.95	8.91	8.41	10.68
Cincinnati	9.34	10.26	10.75	65.30	11.71	9.33	11.53	16.27	10.14	9.44	11.68
Cleveland	8.57	9.98	10.92	56.18	10.86	8.66	11.25	16.06	9.30	8.65	10.92
Dallas	9.62	10.05	11.75	....	10.57	9.03	12.98	16.95	9.26	9.35	11.97
Detroit	9.48	10.46	11.05	52.00	11.78	9.53	11.01	16.23	10.14	9.43	11.61
Denver	9.41	11.77	12.11	....	9.86	10.10	11.47	....	10.02	9.69	11.83
Houston	9.22	9.65	11.35	52.00	10.78	8.63	13.10	16.55	8.86	8.95	10.60
Indianapolis	9.66	10.64	11.14	....	11.83	9.66	11.09	16.39	10.01	9.50	11.79
Kansas City	9.21	10.87	11.35	....	10.87	9.31	11.57	15.72	9.80	9.10	....
Los Angeles	9.50	11.20	12.20	61.27	11.20	9.55	14.20	17.35	10.45	9.70	11.70
Memphis, Tenn.	8.98	10.05	....	....	10.64	8.82	12.74	....	9.01	8.66	11.41
Milwaukee	8.71	10.34	10.29	....	10.88	8.69	10.89	16.09	9.13	8.55	10.82
Moline, Ill.	8.92	10.55	10.50	....	11.09	8.90	11.00	16.30	9.26	8.76	11.03
Newark, N. J.	9.36	10.13	11.35	....	11.46	9.74	13.25	16.40	10.20	9.51	11.05
New York	9.36	10.13	11.35	52.98	11.46	9.74	13.25	16.40	10.20	9.51	11.00
Philadelphia	8.35	9.60	10.66	52.71	10.35	8.75	11.95	16.38	8.95	8.70	9.95
Pittsburgh	8.57	9.98	11.13	52.00	10.84	8.55	11.25	15.95	8.91	8.41	10.68
Portland, Oreg.	9.45	11.30	12.35	....	11.45	9.45	16.65	17.80	10.05	9.60	11.75
St. Louis	8.77	10.53	11.08	....	10.94	8.77	11.28	16.33	9.14	8.77	10.91
St. Paul	8.84	9.69	10.84	....	11.01	8.82	11.49	16.54	9.18	8.68	10.95
San Francisco	10.17	11.69	11.40	54.00	11.78	10.07	15.10	17.25	10.49	10.38	12.47
Seattle	10.51	11.57	12.50	54.02	11.95	9.94	16.20	17.80	10.65	10.10	12.73
Spokane, Wash.	10.36	11.42	12.35	54.02	11.80	9.79	16.20	17.85	10.50	9.95	12.58

Specifications: Hot rolled sheet, sheared edge, 10 Ga. & 36 x 96-120 in.; cold rolled sheets, 20 Ga. & 36 x 96-120 in.; galvanized sheets, 10 Ga. x 36 x 120 in. except Los Angeles, Dallas and Houston, 10 Ga. x 48 x 120 in.; stainless, 16 Ga. & 36 in.; hot rolled strip, ⅛ in. x 1 in.; hot rolled carbon bars, rounds, ¾ in.—1¼ in., M1020; cold finished bars, 1 in., C1018; hot rolled alloy bars, 4140 annealed, 1⅝ in.—2⅜ in. rounds; structural shapes, I beams, 6 x 12½ in.; carbon plates, sheared, through ½ in. x 84 in.; floor plates, ¼ in. x 36 in.

Refractories

Fire Clay Brick (per 1000 pieces*)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., Canon City, Colo., $140; Salina, Pa., $145; Niles, Ohio, $146; Cutler, Utah, $175.

Super-Duty: Ironton, Ohio, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Md., St. Louis, $185; Stevens Pottery, Ga., $195; Cutler, Utah, $248.

Silica Brick (per 1000 pieces*)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, Ohio, Hawstone, Pa., St. Louis, $158; Warren, Niles, Windham, Ohio, Hays, Latrobe, Morrisville, Pa., $163; E. Chicago, Ind., Joliet, Rockdale, Ill., $168; Canon City, Colo., $173; Lehi, Utah, $183; Los Angeles, $185.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, Ohio, Leslie, Md., Athens, Tex., $158; Morrisville, Hays, Latrobe, Pa., $163; E. Chicago, Ind., St. Louis, $168; Canon City, Colo., $183; Curtner, Calif., $185.

Semisilica Brick (per 1000 pieces*)

Woodbridge, N. J., Canon City, Colo., $140; Philadelphia, Clearfield, Pa., $145.

Ladle Brick (per 1000 pieces*)

Dry-Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Vandalia, Mo., New Salisbury, Ohio, $97; Vanport, Pa., Wellsville, Irondale, Ohio, $100; Clearfield, Pa., Portsmouth, Ohio, $102; St. Louis, Mexico, Mo., $120.

High-Alumina Brick (per 1000 pieces*)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., Danville, Ill., $250; Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., $260.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $310; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., $320; Philadelphia, $325.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $350; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., $360; Philadelphia, $365.

Sleeves (per 1000)

St. Louis, $193; Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., $188; Ottawa, Ill., $205.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Clearfield, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Nario, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.00.

Magnesite (per net ton)

Domestic, dead-burned, ½ in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅜ in. grains with fines: Baltimore (periclase), $73; Pascagoula, Miss. (periclase), $90.

*—9 in. x 4½ x 2.50 straights.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Inches		Per
Diam	Length	100 lb
2	24	$64.00
2½	30	41.50
3	40	39.25
4	40	37.00
5½	40	36.50
6	60	33.25
7	60	29.75
8, 9, 10	60	29.50
12	72	28.25
14	60	28.25
16	72	27.25
17	60	27.25
18	72	27.00
20	72	26.50
24	84	27.25

CARBON

8	60	14.25
10	60	13.80
12	60	14.75
14	60	14.75
14	72	12.55
17	60	12.65
17	72	12.10
20	90	11.55
24	72, 84	11.95
24	96	12.10
30	84	12.00
35, 40	110	11.60
40	100	12.50

Canadian Steel

(Cents per lb, f.o.b. mill, except as otherwise noted)

Billets, Blooms & Slabs:

Carbon (N.T.):	
Forging	$97.00
Rerolling	78.00
Alloy (N.T.)	115.00
Wire Rods:	
Carbon	5.70
Alloy	6.40
Wire (carload lots):	
Merchant annealed	8.40
Low carbon indus.	7.20
Upholstery spring	8.55
M.B. spring	8.85
Bars & Small Shapes:	
Carbon, merchant	5.30
Carbon, special	5.85
Alloy	6.40
Bar Mill Bands:	
Carbon	5.40
Alloy	8.05
Bars, Reinforcing	5.30

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-$36.50. Imported, net ton, f.o.b. cars point of entry, duty paid, metallurgical grade; European, $30-$33, contract; Mexican, all rail, duty paid, $28-$28.50; barge, Brownsville, Tex., $30-$31.

Metal Powder

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as noted.)

	Cents
Sponge Iron, domestic and foreign, 98% Fe, min. trucklots, freight allowed east of Mississippi River:	
100 mesh, bags	11.50
100 mesh, pails	9.85‡
40 mesh, bags	8.10††
Electrolytic Iron,	
Melting stock, 99.9% Fe, irreg. fragments, ⅛ in. x 1.3 in.	28.75
(In contract lots of 750 tons price is 22.75c.)	
Annealed, 99.5% Fe.	36.75, ton, del. east of Mississippi.
Unannealed (99+% Fe)	33.0
Unannealed (99+% Fe) (minus 325 mesh)	38.0
Carbonyl Iron: 90-99.9%, 3 to 20 microns, depending on grade, 88.00-700.00 in standard 200-lb containers; all minus 200 mesh.	
Aluminum: Atomized, 600-lb drum freight allowed, c.l.	39.80; ton lots 41.80
Brass, 80/20, leaded (60 mesh)	36.50
Bronze powder, 90/10	54.20
Copper, all types	15.25*
Lead	7.50*
Manganese, minus 35 mesh	1.00
Nickel, all types	0.78-1.06
Nickel-Silver	57.90
Solder	7.50*
Stainless Steel, 304	89.00
Stainless Steel, 316	$1.07
Steel, AISI 4650	32.00
Tin	14.00*
Zinc	23.20
Cobalt:	Dollars
98.5%, minus 100-300 mesh	1.57-1.58
99.5%, below 5 microns	2.32
Tungsten	nom.
Molybdenum	4.35

*Plus cost of metal. ‡Depending on mesh. §Cutting and scarfing grades. **Depending on price of ore. ††Welding grade.

Imported Steel

(Base per 100 lb, landed, duty paid; based on current ocean rates with any rise for buyer's acc't. Source of shipment: Western Europe)

	North Atlantic	Great Lakes	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$5.65	$5.90	$5.60	$5.50	$5.80
Bar Size Angles	5.85	6.10	5.80	5.70	6.00
Structural Angles	5.65	5.90	5.60	5.50	5.80
I-Beams	5.60	5.85	5.55	5.45	5.75
Channels	5.60	5.85	5.55	5.45	5.75
Plates (basic bessemer)	5.45	5.80	5.50	5.40	5.70
Sheets, hot rolled and galvanized	Nom.	....	Nom.	Nom.	Nom.
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	25.20	24.70	24.40	24.40	25.20
Barbed Wire (†)	6.50	6.40	6.40	6.25	6.60
Merchant Bars	5.85	6.10	5.80	5.70	6.00
Hot-Rolled Bands	5.95	6.20	5.90	5.80	6.10
Wire Rods, Thomas Commercial No. 5	5.80	5.85	5.75	5.75	6.00
Wire Rods, O. H., No. 5	6.00	6.05	5.95	5.95	6.25
Bright Common Wire Nails (§)	6.55	6.80	6.50	6.40	6.70

†Per 82 lb net reel. §Per 100-lb keg, 20d nails and heavier.

Ores

Lake Superior Iron Ore

(Prices effective for the 1960 shipping season, subject to later revision, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Lump ½ in. and up	12.85
Fines, under ½ in.	10.72
Mesabi nonbessemer	11.45
Old Range bessemer	11.85
Old Range nonbessemer	11.70
Open-hearth lump	12.70
High phos.	11.45

Based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 1, 1960; increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

New Jersey, concentrates nom.

Foreign Iron Ore

Cents per unit

Swedish basic, 65%, c.l.f. Atlantic ports	25.00†
Chilean, 62-65%, c.l.f. Atlantic ports	22.00
Brazilian, 68.5% f.o.b. vessel, Victoria, per ton	$11.50

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$19.00-19.50*
Domestic, concentrates, f.o.b. milling points	22.00-23.00

Manganese Ore

Mn 46-48%, Indian, 85-90c, nom. per long ton unit, c.i.f. U. S. ports, duty for buyer's account.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charlestown, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian	
48% 3:1	$34.00-35.00†
48% no ratio	25.00-26.00†
South African Transvaal	
44% no ratio	18.75
48% no ratio	24.00-26.00†
Turkish	
48% 3:1	35.00-37.00†
Domestic	
Rail nearest seller	
18% 3:1	30.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked $1.23

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

55-60%	$2.70-3.20
60-65%	3.25-3.45

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

*Before duty. †Nominal.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa., furnace	$14.75-15.25
Connellsville, Pa., foundry	18.00-18.50

Oven Foundry

Birmingham, ovens	$30.35
Cincinnati, deld.	33.34
Buffalo, ovens	32.00
Chattanooga, Tenn., ovens	30.80
Detroit, ovens	32.00
Pontiac, Mich., deld.	34.05
Saginaw, Mich., deld.	35.63
Erie, Pa., ovens	32.00
Indianapolis, ovens	31.25
Ironton, Ohio, ovens	30.50
Cincinnati, deld.	33.64
Kearny, N. J., ovens	31.25
Milwaukee, ovens	32.00
Neville Island (Pittsburgh), Pa., ovens	30.75
New Haven, Conn., ovens	31.00
Painesville, Ohio, ovens	32.00
Cleveland, deld.	34.45
Philadelphia, ovens	31.00
St. Louis, ovens	33.00
St. Paul, ovens	31.25
Chicago, deld.	34.78
Swedeland, Pa., ovens	31.00
Terre Haute, Ind., ovens	31.25

Coal Chemicals

(Representative prices)

Cents per gal f.o.b. tank cars or tank trucks, plant.	
Pure benzene	34.00
Xylene, industrial grade	29.00
Creosote	24.00
Naphthalene, 78 deg.	6.00
Toluene, one deg. (deld. east of Rockies)	25.00
Cents per lb, f.o.b. tank cars or tank trucks, deld.	
Phenol, 90 per cent grade	14.75
Per ton bulk, f.o.b. cars or trucks, plant.	
Ammonium sulfate, regular grade	$32.00

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, 10 lb pigs, per gross ton, Palmerton, Pa., 21-23% Mn, $102.50; 19-21% Mn, 1-3% Si, $100; 16-19% Mn $98. For Neville Island, Pa., prices add $2.50 as of Feb. 1. Lump 35 lb and down: Deduct $2 from 10 lb pig prices at Palmerton.

Standard Ferromanganese: (Mn 74-76%, C 7% approx) base price per net ton, $220, Johnstown, Duquesne, Sheridan, Neville Island, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively (Min 79-81%). Lump $228 per net ton, f.o.b. Anaconda, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-95%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 4c for max 0.15% C grade from above prices, 5.3c for max 0.08% C, 6.6c for max 0.5% C, and 8.1c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 24c per lb of contained Mn; packed, carload 25.3c, ton lot 26.9c, less ton 28.1c.

Electrolytic Manganese Metal: Min carload, bulk, 34.25c; 2000 lb to min carload, 37c; less ton, 39c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi River; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Carload, lump, bulk, 1.50% C grade, 18.5-21% Si, 11.6c per lb of alloy. Packed, c.l. 12.8c, ton 13.25c, less ton 14.25c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 16-18.5%, deduct 0.3c from above prices. For 3% grade, Si 12.5-16% deduct 0.5c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton to 300 lb, $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton to 300 lb $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract min c.l. $250 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis. Spot, $255.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4%). Contract., c.l. $300 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed. Spot, $305.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: C.l. lump, bulk, 28.75c per lb of contained Cr. Delivered.

Charge Chrome: Cr 58-65%, C 5-7%, Si 4-6%, S 0.03% max., 20.00c per lb of contained Cr, carlots, lump, bulk, delivered.

Blocking Chrome: Cr 55-63%, C 4-6%, Si 8-12%, 23.50c per lb of contained Cr, delivered in carlots, lump, bulk.

Refined Chrome: Cr 58-65%, C 4.25% max., Si 1.0% max., S 0.03%, 21.00c per lb of contained Cr, carlots, lump, bulk, delivered.

Low-Carbon Ferrochrome (Simplex) Cr 63-66% or 68-71%: C 0.025% max., 31.50c; C 0.010% max., 32.50c per lb of contained Cr, carlots, lump, bulk, delivered.

Cr 68-73%: C 0.25% max., 33.00c. Cr 65-71%: C. 0.05% max., 32.00c; C 0.10% max, 31.75c; C 0.20% max, 31.50c; C 0.50% max, 31.25c; C 1.0% max, 31.00c; C 1.5%, 30.75c; C 2.0% max, 30.50c, carlots, lump, bulk, delivered.

Foundry Ferrochrome, High-Carbon: (Cr 62-68%, C 5-7%, Si 7-10%). C.l., 2" x D, bulk 30.8c per lb of contained Cr. Packed, c.l. 32.4c, ton 34.2c, less ton 35.7c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). SM x D, carload, bulk, 20.05c per lb of alloy carload packed 21.25c, ton lot 22.50c, less ton lot 23.70c. Delivered. Spot, add 0.25c.

Ferrochrome-Silicon: Cr 39-41%, Si 42-45%, C 0.05% max, 22.50c per lb contained Cr and 14.60c per lb contained Si; Cr 33-36%, Si 45-48%, C 0.06% max, 22.50c per lb contained Cr, 14.60c per lb contained Si.

Chromium Metal, Electrolytic: Commercial grade (C 99.8% min, metallic basis Fe 0.2% max). Contract, carlot packed, 2" x D plate (above ¼" thick) $1.15 per lb, ton lot $1.17, less ton lot $1.19. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open hearth grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55% or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1, $1.05 per lb; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lot, packed, $1.38 per lb contained V_2O_5 freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Carload, lump, bulk, 14.6c per lb contained Si. Packed, c.l. 17.1c, ton lot 18.55c, less ton 20.20c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Chattanooga, Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Keokuk, Iowa; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Carload, lump, bulk, 15.75c per lb contained silicon. Packed, c.l. 17.75, ton lot 19.55c, less ton 20.9c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Carload, lump, bulk, 16.9c per lb of contained Si. Packed, c.l. 18.8c, ton lot 20.45c, less ton 21.7c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Carload, lump, bulk, 20c per lb of contained Si. Packed, c.l. 21.65c, ton lot 23.05c, less ton 24.1c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 1.00% max Fe, 0.7% max Ca). C.l. lump, bulk, 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Add 0.5c for 0.50% Fe grade analyzing 98.25% min Si.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.85c per lb of alloy; ton lots, packed, 10.85c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l., lump, bulk, 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Carload, bulk, 26.25c per lb of alloy, carload, lump, packed 27.25c, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: 100 lb or more packed (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices 100 lb and over are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload, $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Carbortam: (B 1 to 2%). Lump, carload $320 per ton, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETED ALLOYS

Chromium Briquets: (Weighing approx 3% lb each and containing 2 lb of Cr). Carload, bulk 19.60c per lb of briquet, in bags 20.70c; 3000 lb to c.l. pallets 20.80c; 2000 lb to c.l. in bags 21.90c; less than 2000 lb in bags 22.80c. Delivered. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Carload, bulk 13.7c per lb of briquet; c.l. packed, bags 14.9c; 3000 lb to c.l., pallets 14.9c; 2000 lb to c.l., bags 16.1c; less ton 17c. Delivered. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). C.l. bulk 14c per lb briquet; c.l. packed, bags 15.2c; 3000 lb to c.l., pallets 15.2c; 2000 lb to c.l., bags 16.4c; less ton 17.3c. Delivered. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si and small sizes, weighing approx 2½ lb and containing 1 lb of Si). Carload bulk 8c per lb of briquet; packed, bags 9.2c; 3000 lb to c.l., pallets 9.6c; 2000 lb to c.l., bags 10.8c; less ton 11.7c. Delivered. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.49 per lb of Mo contained, f.o.b. Langeloth, Pa.

Titanium Briquets: Ti 98.27%, $1 per lb f.o.b. Niagara Falls, N. Y.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). $5.25 per lb (all quantities) of contained W. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 4% max, C 0.1% max). Ton lots 2" x D, $3.45 per lb of contained Cb; less ton lots $3.50 (nominal). Delivered.

Ferrotantalum Columbium: (Cb 44-77% approx, Ta 15% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lots 2" x D, $3.05 per lb of contained Cb plus Ta, delivered; less ton lots, $3.10.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Carload, bulk 19.25c per lb of alloy, c.l. packed ½ in. x 12 M 20.00c, ton lot 21.15c, less ton 22.40c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 20% per lb of alloy, ton lot 21.15c; less ton lot 22.4c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.45c per lb of alloy; ton lot 19.95c; less ton lot 21.20c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Siminal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk, 19.25c. Packed c.l. 20.25c; 2000 lb to c.l. 21.25c; less than 2000 lb 21.75c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $5 for each 1% of P above or below the base). Carload, bulk, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $120 per gross ton.

Ferromolybdenum: (65-75%). Per lb of contained Mo in 200-lb container, f.o.b. Langeloth and Washington, Pa., $1.76 in all sizes except powdered which is $1.82.

Technical Molybdic-Oxide: Per lb of contained Mo, in cans $1.47; in bags, $1.46, f.o.b. Langeloth and Washington, Pa.

SANDVIK SERVICE

is more than a smile

KNOWLEDGE

EXPERIENCE

INTEREST

INDIVIDUAL ATTENTION

METALLURGICAL AND ENGINEERING ASSISTANCE

Along 5 Product Lines

COLD ROLLED SPRING STEELS, WIRE & TUBING

STEEL BELT CONVEYORS AND PROCESSING UNITS

COROMANT CARBIDE TOOLING

POWER SPRINGS

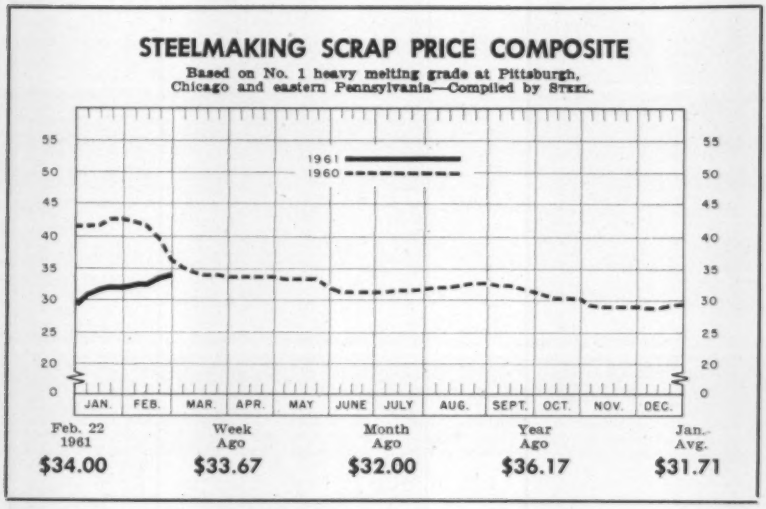
HAND SAWS & TOOLS

It is all of Sandvik's accumulated, world wide experience and ability made available to you through your Sandvik representative. He will help you get the utmost out of the specific Sandvik product line he represents.

SANDVIK

SANDVIK STEEL, INC.

1702 Nevins Road, Fair Lawn, N. J.
SWarthmore 7-6200
In N. Y. C. ALgonquin 5-2200
Branch Offices: Cleveland • Detroit
Chicago • Los Angeles
SANDVIK CANADIAN LTD.
P. O. Drawer 1335, Sta. O., Montreal 9, P. Q.
Works: Sandviken, Sweden



Scrap Index Rises on Light Buying

STEEL's composite price gains another 33 cents a ton, reaching $34. Buying for export continues to be the chief market support with steel operations sluggish

Scrap Prices, Page 172

• **Chicago** — A few scattered mill purchases, coupled with continuing demand for export, have lifted prices of several leading grades $1 to $2 a ton. The market is slightly stronger even though steelmaking operations show no sign of accelerating significantly before early April.

• **Pittsburgh**—With district steelmaking gradually moving up (51 per cent of 1960 capacity last week vs. 47 per cent in preceding weeks), there's more buying interest in scrap. Several mills are in the market for industrial bundles. Trade sources predict brokers' bids on the March output of No. 1 factory bundles from GM's Fisher Body Div. will be higher.

• **Philadelphia** — Milder weather has resulted in a better flow of scrap, checking the upturn in domestic prices which had developed recently. Only one grade advanced last week, drop broken machinery, which rose $1 to $49-$50 delivered.

• **New York**—Brokers have boosted their buying prices $1 a ton on the major open hearth grades. Milder weather has made the movement of scrap easier, but export buying is stronger, and there is quickening interest in domestic mill requirements.

• **Cleveland**—Despite the absence of strong mill demand, the local market appears to be firmer, largely reflecting shortening supplies resulting from curtailed manufacturing schedules, particulary at automotive shops. It's thought that monthend auto lists will be lower and that bids for the material will be higher. Also contributing to strength is the earmarking of substantial tonnage for export when navigation opens this spring.

• **Detroit**—While the district market continues to be soft, dealers and brokers expect a pickup on the auto lists which will be small. It's felt that broker buying for export is about completed for the present.

• **Buffalo**—Prices are firm, largely because of export demand and relatively light supplies of some grades. No new mill orders of consequence are being booked, and the outlook for March buying is not promising. Rerolling rails have advanced to $56.50-$57.50 as a result of purchases.

• **Cincinnati** — Prices are moving up with higher prices anticipated at monthend on industrial lists. Increases of $1 a ton have been posted on the principal steelmaking grades in brokers' quotations. No. 1 heavy melting is now quoted $27.50-$28.50.

• **St. Louis**—Scrap is being shipped down the Mississippi by barge to New Orleans for export. The movement has resulted in price boosts on several grades and has generally strengthened the market. No. 1 heavy melting is up $3 to $30; No. 1 bundles are up $2 to $30, No. 1 cupola $2 to $40, while rail angles and splice bars are up $3 to $40 a ton. Not much material is moving on domestic account.

• **Birmingham** — Prices are unchanged, but export demand is strong and is providing market support in the absence of domestic buying. Steelmaking operations in this area are estimated at 60 per cent of capacity.

• **Houston**—Brisk demand for export continues here. Prices are steady, and scrap is difficult to get because yard intake has been off in recent weeks due to bad weather. Exporters are doing some sharp bargaining in getting tonnage for scheduled cargoes. Mexico is not in the market for substantial tonnage at present.

• **Seattle**—The market is fairly active, and the recent price increase appears to be sticking. Exporters are stockpiling material, anticipating new orders when their present commitments are completed. Shipbreaking is increasing in this area. The government is offering additional vessels for dismantling.

• **San Francisco**—Token purchases are being made by the steel mills in this area, paying quoted prices. However, it's reported that one of the small mills is paying as much as $5 over posted levels. Japan is expected to increase its buying next quarter.

• **Los Angeles**—While the market continues to be quiet, prices are unchanged, and no change is expected until next month at the earliest.

Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including brokers' commission, as reported to STEEL, Feb. 22, 1961. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Feb. 22	$34.00
Feb. 15	33.67
Jan. Avg.	31.71
Feb. 1960	38.87
Feb. 1956	48.96

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	31.00-32.00
No. 2 heavy melting	*29.00-30.00*
No. 1 dealer bundles	31.00-32.00
No. 2 bundles	*26.00-27.00*
No. 1 busheling	31.00-32.00
No. 1 factory bundles	*39.00-40.00*
Machine shop turnings	13.00-14.00
Mixed borings, turnings	13.00-14.00
Short turnings	17.00-18.00
Cast iron borings	17.00-18.00
Cut structurals:	
2 ft and under	34.00-35.00
3 ft and under	33.00-34.00
Heavy turnings	25.00-26.00
Punchings & plate scrap	38.00-39.00
Electric furnace bundles	*39.00-40.00*

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	32.00-33.00
Stove plate	29.00-30.00
Unstripped motor blocks	24.00-25.00
Clean auto cast	31.00-32.00
Drop broken machinery	44.00-45.00‡

Railroad Scrap

No. 1 R.R. heavy melt.	35.00-36.00
Rails, 2 ft and under	*48.00-49.00*
Rails, 18 in. and under	*49.00-50.00*
Random rails	44.00-45.00
Angles, splice bars	*40.00-41.00*
Railroad specialties	44.00-45.00
Rails, rerolling	53.00-54.00

Stainless Steel Scrap

18-8 bundles & solids	175.00-180.00
18-8 turnings	95.00-100.00
430 bundles & solids	90.00-95.00
430 turnings	50.00-55.00

CHICAGO

No. 1 hvy melt., indus.	*32.00-33.00*
No. 1 hvy melt., dealer	*30.00-31.00*
No. 2 hvy melting	*27.00-28.00*
No. 1 factory bundles	35.00-36.00
No. 1 dealer bundles	*31.00-32.00*
No. 2 bundles	*20.00-21.00*
No. 1 busheling, indus.	*32.00-33.00*
No. 1 busheling, dealer	*30.00-31.00*
Machine shop turnings	14.00-15.00
Mixed borings, turnings	16.00-17.00
Shovel turnings	16.00-17.00
Cast iron borings	16.00-17.00
Cut structurals, 3 ft	37.00-38.00
Punchings & plate scrap	38.00-39.00

Cast Iron Grades

No. 1 cupola	41.00-42.00
Stove plate	37.00-38.00
Unstripped motor blocks	33.00-34.00
Clean auto cast	46.00-47.00
Drop broken machinery	46.00-47.00

Railroad Scrap

No. 1 R.R. heavy melt.	*34.00-35.00*
R.R. malleable	43.00-44.00
Rails, 2 ft and under	*48.00-49.00*
Rails, 18 in. and under	*49.00-50.00*
Angles, splice bars	*41.00-42.00*
Axles	55.00-56.00
Rails, rerolling	54.00-55.00

Stainless Steel Scrap

18-8 bundles, solids	165.00-175.00
18-8 turnings	*95.00-100.00*
430 bundles & solids	85.00-90.00
430 turnings	45.00-50.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*22.00-23.00*
No. 2 heavy melting	*16.00-17.00*
No. 1 bundles	*23.00-24.00*
No. 2 bundles	*14.00-15.00*
No. 1 busheling	*21.00-22.00*
Machine shop turnings	*7.00-8.00*
Mixed borings, turnings	*8.00-9.00*
Shovel turnings	*9.00-10.00*

Cast Iron Grades

No. 1 cupola	*30.00-31.00*
Stove plate	*24.00-25.00*
Heavy breakable	*23.00-24.00*
Unstripped motor blocks	*20.00-21.00*
Charging box cast	*25.00-26.00*
Clean auto cast	*36.00-37.00*

CLEVELAND

No. 1 heavy melting	29.00-30.00
No. 2 heavy melting	**19.00-20.00†**
No. 1 factory bundles	*37.00-38.00*
No. 1 bundles	*31.50-32.50*
No. 2 bundles	16.00-17.00
No. 1 busheling	*30.00-31.00*
Machine shop turnings	10.00-11.00
Shovel turnings	14.00-15.00
Mixed borings, turnings	14.00-15.00
Cast iron borings	14.00-15.00
Cut foundry steel	31.00-32.00
Cut structurals, plate, 2 ft and under	36.00-37.00
Low phos. punchings & plate	28.00-29.00
Alloy free, short shovel turnings	14.00-15.00
Electric furnace bundles	*29.00-30.00*

Cast Iron Grades

No. 1 cupola	37.00-38.00
Charging box cast	24.00-25.00
Heavy breakable cast	26.00-27.00
Stove plate	34.00-35.00
Unstripped motor blocks	29.00-30.00
Brake shoes	35.00-36.00
Clean auto cast	43.00-44.00
Burnt cast	30.00-31.00
Drop broken machinery	44.00-45.00

Railroad Scrap

R.R. malleable	*43.00-44.00*
Rails, 2 ft and under	*50.00-51.00*
Rails, 18 in. and under	*50.00-51.00*
Rails, random lengths	*42.00-43.00*
Cast steel	*40.00-41.00*
No. 1 railroad cast	*46.00-47.00*
Railroad specialties	*43.50-44.50*
Angles, splice bars	*41.50-42.50*
Rails, rerolling	*54.00-55.00*

Stainless Steel Scrap (Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	150.00-155.00
18-8 turnings	65.00-70.00
430 clips, bundles, solids	65.00-70.00
430 turnings	10.00-20.00

YOUNGSTOWN

No. 1 heavy melting	32.00-33.00
No. 2 heavy melting	21.00-22.00
No. 1 busheling	*33.00-34.00*
No. 1 bundles	*35.00-36.00*
No. 2 bundles	20.00-21.00
Machine shop turnings	12.00-13.00
Shovel turnings	17.00-18.00
Cast iron borings	17.00-18.00
Low phos.	34.00-35.00
Electric furnace bundles	*35.00-36.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*36.00-37.00*

BUFFALO

No. 1 heavy melting	27.00-28.00
No. 2 heavy melting	23.00-24.00
No. 1 bundles	27.00-28.00
No. 2 bundles	20.00-21.00
No. 1 busheling	27.00-28.00
Shovel turnings	16.00-17.00
Machine shop turnings	12.00-13.00
Cast iron borings	14.00-15.00
Low phos. structurals and plates, 2 ft and under	37.00-38.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	36.00-37.00
No. 1 machinery	43.00-44.00

Railroad Scrap

Rails, random lengths	40.00-41.00
Rails, 3 ft and under	46.00-47.00
Rails, rerolling	*56.50-57.50*
Railroad specialties	39.00-40.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*27.50-28.50*
No. 2 heavy melting	*25.50-26.50*
No. 1 bundles	*28.50-29.50*
No. 2 bundles	*20.00-21.00*
No. 1 busheling	*27.50-28.50*
Machine shop turnings	10.00-11.00
Mixed borings, turnings	11.00-12.00
Shovel turnings	11.00-12.00
Cast iron borings	11.00-12.00
Low phos. 18 in.	35.00-36.00

Cast Iron Grades

No. 1 cupola	*36.00-37.00*
Heavy breakable cast	28.00-29.00
Charging box cast	35.00-36.00
Drop broken machinery	46.00-47.00

Railroad Scrap

No. 1 R.R. heavy melt.	*31.00-32.00*
Rails, 18 in. and under	*45.00-46.00*
Rails, random lengths	*38.00-39.00*

PHILADELPHIA

No. 1 heavy melting	39.00
No. 2 heavy melting	36.00
No. 1 bundles	40.00
No. 2 bundles	26.00
No. 1 busheling	40.00
Electric furnace bundles	41.00
Mixed borings, turnings	15.00
Shovel turnings	21.00
Machine shop turnings	14.00
Heavy turnings	25.00†
Structurals & plates	41.00-43.00
Couplers, springs, wheels	43.00
Rail crops, 2 ft & under	50.00-52.00

Cast Iron Grades

No. 1 cupola	38.00
Heavy breakable cast	39.00
Drop broken machinery	*49.00-50.00*
Malleable	46.00†

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	*28.00-29.00*
No. 2 heavy melting	*20.00-21.00*
No. 1 bundles	*28.00-29.00*
No. 2 bundles	*17.00-18.00*
Machine shop turnings	3.50-4.00†
Mixed borings, turnings	4.00-4.50†
Shovel turnings	5.00-6.00†
Low phos. structurals & plates	31.00-32.00†

Cast Iron Grades

No. 1 cupola	34.00-35.00
Unstripped motor blocks	23.00-24.00
Heavy breakable	28.00-29.00

Stainless Steel

18-8 sheets, clips, solids	*150.00-155.00*
18-8 borings, turnings	70.00-75.00
410 sheets, clips, solids	40.00-45.00
430 sheets, clips, solids	*55.00-60.00*

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	23.00-24.00
No. 2 heavy melting	19.00-20.00
No. 1 bundles	23.00-24.00
No. 1 busheling	23.00-24.00
Machine shop turnings	5.00-6.00
Shovel turnings	9.00-9.50
No. 1 cast	39.00-40.00
Mixed cupola cast	30.00-30.50
No. 1 machinery cast	40.00-42.00

BIRMINGHAM

No. 1 heavy melting	32.00-33.00
No. 2 heavy melting	22.00-23.00
No. 1 bundles	33.00-34.00
No. 2 bundles	20.00-21.00
No. 1 busheling	32.00-33.00
Cast iron borings	10.00-11.00
Machine shop turnings	15.00-16.00
Shovel turnings	18.00-19.00
Bar crops and plate	37.00-38.00
Structurals & plate	36.00-37.00
Electric furnace bundles	34.00-35.00
Electric furnace:	
3 ft and under	34.00-35.00
2 ft and under	35.00-36.00

Cast Iron Grades

No. 1 cupola	45.00-46.00
Stove plate	45.00-46.00
Unstripped motor blocks	33.00-34.00
No. 1 wheels	34.00-35.00

Railroad Scrap

No. 1 R.R. heavy melt.	32.00-33.00
Rails, 18 in. and under	45.00-46.00
Rails, random lengths	37.00-38.00
Angles, splice bars	37.00-38.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	*30.00*
No. 2 heavy melting	25.00
No. 1 bundles	*30.00*
No. 2 bundles	20.00
No. 1 busheling	28.00
Machine shop turnings	8.00
Shovel turnings	10.00

Cast Iron Grades

No. 1 cupola	*40.00*
Charging box cast	33.00
Heavy breakable cast	31.00
Unstripped motor blocks	33.00
Clean auto cast	41.00
Stove plate	35.00

Railroad Scrap

No. 1 R.R. heavy melt.	32.00
Rails, random lengths	37.00†
Rails, rerolling	49.00†
Rails, 18 in. and under	40.00†
Angles, splice bars	*40.00*

HOUSTON

(Brokers' buying prices; f.o.b. car)

No. 1 heavy melting	35.00-36.00†
No. 2 heavy melting	31.00
No. 1 bundles	35.00-36.00
No. 2 bundles	21.00-22.00
Machine shop turnings	7.00-8.00†
Low phos. plate & structurals:	
3 ft	36.00-37.00
2 ft and under	39.00-40.00

Cast Iron Grades

No. 1 cupola	36.00-37.00
Heavy breakable	24.00
Foundry malleable	29.00-30.00†
Unstripped motor blocks	30.00-31.00

Railroad Scrap

R.R. heavy melt. (3 ft)	36.00-37.00

LOS ANGELES

No. 1 heavy melting	30.00
No. 1 hvy melt (export)	34.00*
No. 2 heavy melting	28.00
No. 2 hvy melt (export)	30.00*
No. 1 bundles	25.00
No. 2 bundles	19.00
No. 2 bundles (export)	22.00*
Machine shop turnings	12.00
Shovel turnings	12.00
Cast iron borings	12.00
Cut structurals and plate 1 ft and under	40.00

Cast Iron Grades

No. 1 cupola	39.00

Railroad Scrap

No. 1 R.R. heavy melt.	34.00-36.00

PORTLAND, OREG.

(Prepared, f.o.b. car)

No. 1 heavy melting	38.00-39.00
No. 2 heavy melting	35.00-36.00
No. 2 bundles	22.00-23.00
Shovel turnings	13.00
Electric furnace bundles	46.00

Cast Iron Grades

No. 1 cupola	39.00
Heavy breakable	36.00-37.00
Unstripped motor blocks	33.00
Stove plate (f.o.b. plant)	35.00-36.00

SEATTLE

(Prepared, f.o.b. car)

No. 1 heavy melting	38.00-39.00
No. 1 hvy (unprepared)	33.00-35.00
No. 2 heavy melting	35.00-36.00
No. 2 hvy (unprepared	31.00-33.00
No. 2 bundles	22.00-23.00
Shovel turnings	15.00
Electric furnace bundles	46.00

Cast Iron Grades

No. 1 cupola	39.00
Heavy breakable cast	36.00-37.00
Unstripped motor blocks	31.00-33.00
Stove plate (f.o.b. plant)	35.00-36.00

SAN FRANCISCO

No. 1 heavy melting	32.00
No. 2 heavy melting	29.00
No. 1 bundles	27.00-28.00
No. 2 bundles	18.00
Machine shop turnings	14.00
Mixed borings, turnings	14.00
Cast iron borings	14.00
Heavy turnings	14.00
Shovel turnings	14.00
Cut structurals, 3 ft	40.00

Cast Iron Grades

No. 1 cupola	46.00-48.00
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	45.00-46.00
No. 1 wheels	34.00

HAMILTON, ONT.

(Brokers' buying prices; net tons)

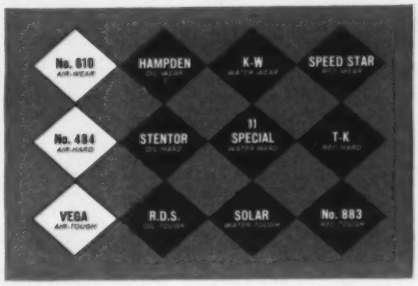
No. 1 heavy melting	24.00
No. 2 hvy melt, 2 ft & under	22.50
No. 1 bundles	24.00
No. 2 bundles	17.00
Mixed steel scrap	16.00
Mixed borings, turnings	12.00
Busheling, new factory:	
Prepared	23.00
Unprepared	18.00
Shovel turnings	12.00

Cast Iron Grades‡

No. 1 machinery cast	30.00

*For export add $4 dock charge.
†Nominal.
‡F.o.b. Hamilton, Ont.
§Delivered.

But what about the RELIABILITY FACTOR in the selection of tool and die steels?



More output per grind . . . steady, high volume production at low cost . . . these are tooling benefits you look for on the job. They stem from the basic quality built into these three Carpenter MEL-TROL® Air-Hardening Tool and Die Steels . . . VEGA-FM, No. 484-FM, and No. 610-FM. Yet, good toolmen know that dependable performance hinges on still another factor: a sound, reliable way to select the right steel for each job. Here's exactly why Carpenter's Matched Set of Air-Hardening Tool and Die Steels gives you a tooling plus: You select quickly and accurately from just three grades to get the exact properties you need for almost any air-hardening application—maximum wear resistance (No. 610), maximum toughness (Vega), or a good combination of hardness and toughness in No. 484.

What's more . . . you know in advance that the steel you select will "deliver the goods". And realize, too, that these three steels are carried in ample stocks for quick delivery from your nearest Carpenter SERVICE-CENTER.

Carpenter steel

you can do it ***consistently*** better with Carpenter Tool and Die Steels

Tool Steel

The Carpenter Steel Company, Main Office and Mills, Reading, Pa.
Alloy Tube Division, Union, N. J.
Webb Wire Division, New Brunswick, N. J.
Carpenter Steel of New England, Inc., Bridgeport, Conn.

Titanium Men Eye Record Sales

Nonferrous Metal Prices, Pages 176 & 177

TITANIUM MILL product shipments may be heading for a record year.

The Department of Commerce forecasts a 10 per cent jump in demand. Other quarters are more optimistic. Barring any sudden reversal in defense policy, they believe that the industry will ship more than 5700 tons of products—an all-time high, edging the previous record of 5650 tons set in 1957.

So far, demand seems to be running true to forecasts. Observers peg January shipments at around 500 tons, about on a par with the high level of activity in 1960's fourth quarter. And there's no sign of any letup. Shipments have shown a consistent increase over each of the last six quarters.

• **Once Burned, Twice Careful** — Industry spokesmen aren't allowing the current pickup to start a wave of optimism. Defense programs have been changed too radically, too many times for titanium men to have many illusions left.

Right now defense activity is favorable to titanium, which accounts for the metal's strong showing in 1960 and the bullish forecasts for 1961. More engines for the Air Force's B-52 bomber are being produced. Buying has been going on for the B-70 program. More titanium is going into missiles (about 15 per cent of the market in 1960). But even a minor shift in top defense thinking could send the industry back into a slump like that of 1958 and 1959.

• **Still Banking on Civilians**—Titanium men remain convinced that their long term future depends on the penetration of civilian markets. There are certain encouraging signs. As civilian aircraft go to higher speeds, titanium's share of this market should grow. Last year, nonmilitary aircraft took 15 per cent of total shipments.

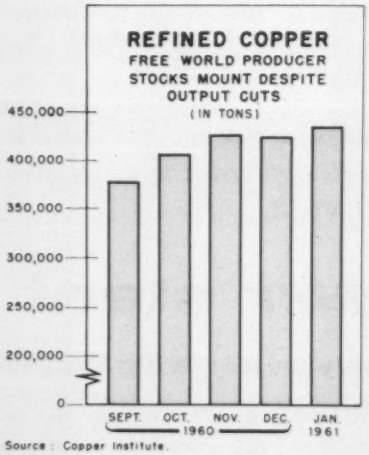
The industry hopes to blast loose more orders from the chemical processing industry this year. Shipments to this market doubled in 1960, an encouraging sign, but the amount was a modest 100 tons. Another 50 tons of the 1960 total went to electronics manufacturers and miscellaneous industries.

• **In the Chips**—Perhaps the best measurement of a change in the market: Titanium Metals Corp. of America, the nation's largest producer, paid dividends of $600,000 to its two owners (Allegheny Ludlum Steel Co. and National Lead Co.) last year, the first announced dividend ever paid on a titanium operation.

Copper Up a Bit

January copper deliveries to fabricators in the U. S. took a modest 8000 ton jump to 99,794 tons, the best month since September. Both refined and crude production dropped slightly but not enough to keep producers' stocks from climbing 5000 tons to 144,132 tons.

In spite of widespread production curtailments and continuing strong demand overseas, Free World producer stocks climbed to 436,889 tons, the highest on record (see chart).



Source: Copper Institute

Nickel Could Set Record

It would take little more than a modest economic recovery in the U. S. for the nickel industry to post a record in 1961. Free World consumption in 1960 exceeded 250,000 tons, a new high and better than 15 per cent over the 1959 total, reports the International Nickel Co. of Canada Ltd.

Strong demand from Europe was the main reason for the good year. Despite the business slowdown here, U. S. demand remained on a par with 1959's. So far, 1961 sales (both here and abroad) are holding at about the same pace as in 1960's fourth quarter.

In the Markets

• **Aluminum Off in '60**—Shipments of aluminum sheets and plates fell to 678,125 tons in 1960 from the 753,835 ton record chalked up in 1959, reports the Aluminum Association. Foil shipments were off only slightly, hitting 116,107 tons vs. 120,548 tons in 1959. In looking ahead at one of aluminum's major markets, Philip Sporn, president of the American Electric Power Co., forecasts that use of the metal for electric power generators could increase by 140 per cent over the next 19 years.

• **Brass Imports Off** — Imports of brass mill products fell about 17 per cent to 164,021,000 lb in 1960. Significantly, though, imports still accounted for about the same share of the total U. S. market as they did in 1959, when a record 199,369,000 lb were brought in.

• **Another Lead-Zinc Cut**—St. Joseph Lead Co. is curtailing its zinc metal production by 15 per cent and will delay expansion of a lead smelter. It is the third North American firm in recent weeks to cut output because of the oversupply and weak markets in the U. S.

VALUE ANALYSIS FACT SHEET

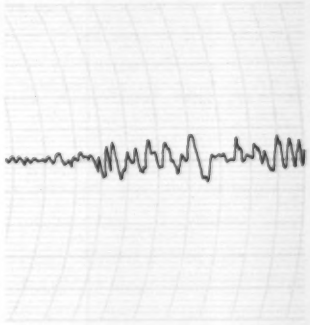
Formbrite Drawn Brass Parts

How to open finishing room bottlenecks and cut polishing costs up to 50%—produce stronger, more scratch-resistant parts—and get additional savings—with Formbrite, superfine-grain drawing brass.

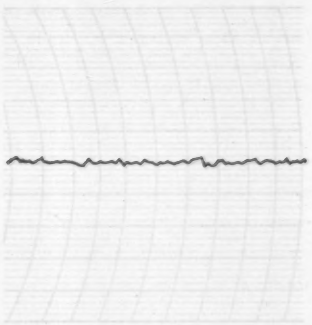
Very often in the production of drawn brass parts which are to be plated or lacquered, finishing costs are greater than those of all preceding operations—or even the cost of the metal. Under any circumstances, they are a high percentage of total costs.

Furthermore, parts go through the pressroom a lot faster than they can through the finishing room, creating bottlenecks in production.

ENLARGED SURFACE TRACES at the right prove that you can lick both cost and time problems with Formbrite®, Anaconda superfine-grain drawing brass. Savings in polishing costs reported by users run from 40 to 50%. These are net savings, as Formbrite costs no more than ordinary drawing brass.

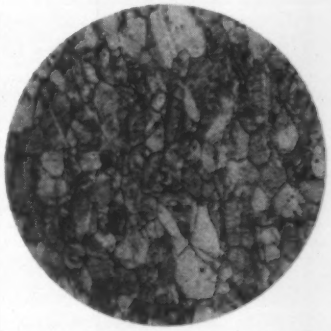


Enlarged surface trace of standard drawing brass (grain size, .045 mm) after 40% elongation. This kind of roughness causes "orange peel" effect in the working of standard drawing brass. Smoothing such mountains down to the valleys takes considerable cutting.

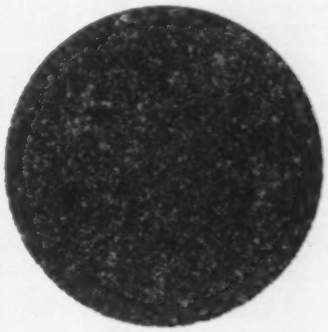


Enlarged surface trace of Formbrite drawing brass (grain size, .005 mm) after 40% elongation. Surface smoothness after deformation is the test of a drawing brass's polishing characteristics. It is relatively easy to level these little hills on the surface of Formbrite. In many cases, users find they eliminate cutting operations altogether, need only a simple color buff.

STRONGER, MORE SCRATCH RESISTANT. Formbrite is stronger, harder, springier than the usual drawing brasses in the same standard tempers, yet retains remarkable ductility for forming and drawing, and takes sharp, clean-cut ornamental die impressions. The harder surface means fewer rejects from scratching and marring during handling. In some instances, the superior strength and hardness of Formbrite make possible the use of a thinner gage metal, with an additional saving in material cost.



This is the microstructure, shown 75x, of the standard drawing brass used above.



This uniform superfine-grain structure of Formbrite, shown 75x, is produced by special procedures for rolling or drawing and annealing developed by Anaconda American Brass Company.

SIZES AND TEMPERS. Brass manufactured by the Formbrite method, with its special characteristic of superfine-grain structure, is supplied in standard Formbrite temper, half-hard, three-quarter-hard, hard, and extra-hard tempers, and can be rolled in heavy coils to .004" in thickness by 24" wide, weighing 100 pounds per inch of width. The table below gives physical data and terminology for Formbrite tempers.

ALLOYS. In addition to 70-30 brass, the following Anaconda alloys also are produced by the Formbrite method: Yellow Brass-59, Gilding Brass-4, Commercial Bronze-14, Red Brass-24, and Low Brass-32.

TECHNICAL ASSISTANCE. For help in selecting the alloy and temper to handle your particular job—for a copy of Publication B-39 with more details about Formbrite—see your Anaconda representative. Or write: Anaconda American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont. 6147

TERMINOLOGY FOR FORMBRITE TEMPERS

TENSILE STRENGTH LB. SQ. IN.		ROCKWELL B HARDNESS		DESIGNATION TO BE USED
MIN.	MAX.	MIN.	MAX.	
49,000	59,000	40	65	Yellow Brass—Formbrite
57,000	67,000	60	77	Half-hard Yellow Brass—Formbrite
64,000	74,000	72	82	Three-quarter-hard Yellow Brass—Formbrite
71,000	81,000	79	86	Hard Yellow Brass—Formbrite
83,000	92,000	85	91	Extra-hard Yellow Brass—Formbrite

FORMBRITE

Superfine-grain drawing brass

a product of

ANACONDA®

Anaconda American Brass Company

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, 50 lb ingots, 26.00, 30,000 lb or more, f.o.b. customer custody.

Aluminum Alloy: No. 13, 25.90; No. 43, 26.20; No. 195, 27.60; No. 214, 31.50; No. 356, 26.80, 50 lb ingots.

Antimony: R.M.M. brand, 99.5%, 29.00; Lone Star brand, 29.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.50-28.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $70.00 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $65 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.60 per lb deld.

Cobalt: 99+%, $1.50 per lb for 500-lb keg; $1.52 per lb for 100 lb case; $1.57 per lb under 100 lb.

Columbium: Powder, $55 per lb and up nom.

Copper: Electrolytic, 29.00 deld.; custom smelters, 29.00; lake, 29.00 deld.; fire refined, 28.75 deld.

Germanium: First reduction, ingots, less than 1 kg, 36.00-37.50 per gram; 1-10 kg, 30.50-32.00 per gram; 10 kg or more, 28.10-29.99 per gram; intrinstic grade, under 10 kg, 31.95 per gram; 10 kg or more, 29.95 per gram.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $70-75 per troy oz nom.

Lead: Common, 10.80; chemical, 10.90; corroding, 10.90; St. Louis, New York basis, add 0.20.

Lithium: 1 lb or 2 lb ingots, less than 24 lb, $11 per lb deld.; 24-90 lb, $9.50; 100-499 lb, $9.25; 450 lb or more, $9 per lb, delivered.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex., 1.3 in. diam. x 12 in. sticks, 57.00 f.o.b. Madison, Ill.

Magnesium Alloy: AZ91A (diecasting), 40.75; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, N. York, $208-210 per 75 lb flask.

Molybdenum: Unalloyed forging billets, 4.125-8.5 in. diam., 50-4999 lb, $8.15 per lb, depending on quantity; 5000 lb or more, $8 per lb, f.o.b. Coldwater, Mich.

Nickel: Electrolytic cathodes, briquettes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, in kegs, 74.50; "F" nickel, 5 lb ingots, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01; Exton, Pa., basis, add 1.60. Nickel oxide sinter at Buffalo, New York, or other established U. S. Ports of entry, contained nickel 69.60.

Osmium: $70-90 per troy oz nom.

Palladium: $24-26 per troy oz.

Platinum: $82-85 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $137-140 per troy oz.

Ruthenium: $55-60 per troy oz.

Selenium: $6.50-7 per lb, commercial grade.

Silver: Open market, 91.375 per troy oz.

Sodium: Solid pack, c.l., 19.50; l.c.l. 20.00; 5 and 12 lb bricks, c.l., 21.00; l.c.l., 21.50; tank car, 17.00.

Tantalum: Melting stock, $35 per lb; rod $60 per lb nom; sheet, $55 per lb nom.

Tellurium: $3.50-5 per lb, 100 lb or more.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot, 101.75; prompt, 101.625.

Titanium: Sponge, 99.3+% grade A-1, ductile (0.3% Fe max.), $1.60 per lb; grade A-2 (0.5% Fe max), $1.50 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 100-lb lots, $2.75-2.85 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00c; 99+% hydrogen reduced, $3.10-4.00.

Zinc: Prime western, 11.50; brass special, 11.75; intermediate, 12.00, East St. Louis, freight allowed over 0.50 per lb. New York basis, add 0.50. High grade, 12.85; special high grade, 13.00 deld. Die casting alloy ingot No. 3, 14.25; No. 2, 14.75; No. 5, 14.50 deld.

Zirconium: Reactor grade sponge, 100 lb or less, $8-8.50 per lb; 100-500 lb, $7.25-7.50 per lb; 500-1000 lb, $6.50-7.25; over 1000 lb, $6.50 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 25.00-26.00; No. 12 foundry alloy (No. 2 grade), 22.75; 5% silicon alloy, 0.60 Cu max., 24.00; 13 alloy, 0.60 Cu max., 24.00; 195 alloy, 25.75; 108 alloy, 23.25. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 23.75; grade 2, 22.50; grade 3, 21.50; grade 4, 21.00.

Brass Ingot: Red brass, No. 115, 27.25; tin bronze, No. 225, 37.00; No. 245, 31.50; high-leaded tin bronze, No. 305, 31.75; No. 1 yellow, No. 405, 22.75; manganese bronze, No. 421, 26.50.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.25; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.935, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.935, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 34.355; l.c.l., 34.98. Weatherproof, 20,000-lb lots, 35.55; l.c.l., 36.30.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $16.50 per cwt; pipe, full coils, $16.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheet and strip, $6.75-15.50; sheared mill plate, $5.25-9.00; wire, $5.55-9.50; forging billets, $3.20-4.75; hot-rolled and forged bars, $3.80-6.25.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 28.00; ribbon zinc in coils, 22.50; plates, 21.50.

ZIRCONIUM

Plate, $14.00-25.00; H.R. strip, $14.00-22.90; C.R. strip, $16.00-35.00; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	138	120	138
Strip, C.R.	124	108	138
Plate, H.R.	130	110	126
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

(Selected products and sizes)

Flat Sheets: 1100, 3003, and 5005, mill finish, 30,000 lb base f.o.b. customer custody.

Thickness Range (in.)	Width (in.)	Length Range (in.)	Price Range
0.250-0.136	24-72	72-180	45.40-48.00
0.136-0.096	24-72	72-180	45.90-48.80
0.096-0.077	24-72	72-180	46.40-50.30
0.077-0.068	24-72	72-180	46.90-52.10
0.068-0.061	24-72	72-180	46.90-55.00
0.061-0.048	24-72	72-180	47.40-57.70
0.048-0.038	24-72	72-180	47.90-60.50
0.038-0.030	24-72	72-180	48.40-65.30
0.030-0.024	24-72	72-180	48.90-67.20
0.024-0.019	24-60	72-180	49.40-59.90
0.019-0.017	24-48	72-144	50.30-57.00
0.017-0.015	24-48	72-144	51.20-58.00
0.015-0.014	24-36	72-144	52.30
0.014-0.012	24-36	72-144	53.50
0.012-0.011	24-36	72-144	54.60
0.011-0.0095	24-46	72-144	56.20
0.0095-0.0085	24-36	72-96	57.50
0.0085-0.0075	24-36	72-96	59.20
0.0075-0.007	24-36	72-96	60.80
0.007-0.006	24-36	72-96	62.50

ALUMINUM (continued)

Plates and Circles: Thickness, 0.25-3 in.; width or diam., 24-60 in.; length, 72-240 in., mill finish.

Alloy	Plates Base	Circle Base
1100, 3003-F	44.60	50.90
5050-F	45.70	50.50
3004-F	46.70	52.40
5052-F	47.30	53.10
6061-T6	47.80	53.90
2024-T4*	51.80	58.90
7075-T6*	60.50	67.90

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 base, 12 ft lengths.

Diam (in.)*	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
0.125	74.90	77.30	....	....
0.188	63.20	63.20	....	80.10
0.250	60.00	62.60	72.70	74.10
0.375	59.20	63.80	71.00	72.00
	2011-T3	2017-T451	2011-T3	2017-T451
0.500	59.20	63.80	71.00	72.00
0.625	59.20	63.80	67.80	67.90
0.750	57.70	62.00	61.60	63.80
0.875	57.70	62.00	61.60	63.80
1.000	57.70	62.00	61.60	63.80
1.125	55.30	59.50	59.50	61.50
1.250	55.30	59.50	59.50	61.50
1.375	55.30	59.50	59.50	61.50
1.500	55.30	59.50	59.50	61.50
1.625	53.00	56.70	....	59.30
1.750	53.00	56.70	58.30	59.30
1.875	53.00	56.70	....	59.30
2.000	53.00	56.70	58.30	59.30
2.250	51.50	55.00	....	59.30
2.500	51.50	55.00	....	59.30
2.750	49.90	53.20	....	59.30
3.000	49.00	53.20	....	59.30
3.250	....	53.20	....	....
3.375	....	53.20	....	....

*Selected sizes.

Forging Stock: Round, Class 1, random length, diam., 0.375-8 in., "F" temper; 2014, 47.50-57.60; 6061, 43.50-57.60; 7075, 61.80-71.90; 7079, 66.80-76.90.

Pipe: ASA schedule 40, alloy 6063-T6, 3-40 ft lengths, plain ends, 90,000 lb base, dollars per ft. Nominal pipe sizes: 1 in., 32.00; 1¼ in., 43.40; 1½ in., 51.80; 2 in., 62.60; 3 in., 124.95; 4 in., 171.80; 5 in., 233.15; 6 in., 308.55; 8 in., 464.35; 10 in., 716.25 (3-24 ft lengths).

Factor	Alloy 6063-T5	Alloy 6062-T6
1-14	45.30-46.80	54.00-60.00
15-17	45.30-46.80	66.50-61.80
18-23	45.80-47.50	58.60-67.60
24-32	45.80-47.50	66.80-81.50
33-38	49.50-52.20	85.10-96.60
39-44	59.80-63.60	102.00-124.00

MAGNESIUM

Sheets and Plates: AZ31B standard grades, .032 in., 103.10; .061 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.00 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .081 in., 108.80; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24-72 in. widths; .125 in., 74.90; .188 in., 71.70-72.70; .25-.75 in., 70.60-71.60. Tooling plate, 0.25-3.00 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grades (AZ31B)
6-8	65.30-67.60	84.60-87.40
12-14	65.30-67.60	85.70-88.00
24-26	66.10-68.40	90.60-91.30
36-38	71.50-75.30	104.20-105.30

NONFERROUS SCRAP

DEALERS' BUYING PRICES

Copper and Brass: No 1 heavy copper and wire, 22.00-22.50; No. 2 heavy copper and wire, 20.50-21.00; light copper, 18.00-18.50; No. 1 composition red brass, 18.25-18.75; No. 1

BRASS MILL PRICES

MILL PRODUCTS a

	Sheet, Strip, Plate	Rod	Wire	Seamless Tubes
Copper	54.13b	51.36c	....	55.32
Yellow Brass	48.10	33.71d	48.39	52.26
Low Brass, 80%	50.65	50.39	50.94	54.71
Red Brass, 85%	51.54	51.48	51.83	55.60
Com. Bronze, 90%	52.98	52.92	53.27	56.79
Manganese Bronze	56.56-56.59	50.22-50.24	60.47	....
Muntz Metal	50.94	46.25	....	....
Naval Brass	52.86	46.67	59.17	57.02
Silicon Bronze	59.49	58.68	58.78	77.90
Nickel Silver, 10%	63.66	65.99	65.74	....
Phos. Bronze, A-5%	74.59	75.09	74.34	76.52

SCRAP ALLOWANCES e

(Based on copper at 29.00c)

	Clean Heavy	Rod Ends	Clean Turnings
Copper	25.000	25.000	24.250
Yellow Brass	19.250	18.375	17.375
Low Brass, 80%	21.375	21.125	20.625
Red Brass, 85%	22.250	22.000	21.500
Com. Bronze, 90%	23.000	22.750	22.250
Manganese Bronze	18.000	17.750	17.250
Muntz Metal	18.125	17.875	17.375
Naval Brass	18.000	17.750	17.250
Silicon Bronze	24.500	24.250	23.500
Nickel Silver, 10%	24.125	23.875	12.062
Phos. Bronze, A-5%	26.125	25.875	24.875

a. Cents per lb, f.o.b. mill; freight allowed on 50 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time of any or all kinds of scrap, add 1 cent per lb.

composition turnings, 17.25-17.75; new brass clippings, 15.50-16.00; light brass, 12.50-13.00; heavy yellow brass, 13.50-14.00; new brass rod ends, 14.50-15.00; auto radiators, unsweated, 13.50-14.00; cocks and faucets, 15.50-16.00; brass pipe, 15.50-16.00.

Lead: Soft scrap lead, 7.00-7.50; battery plates, 2.75-3.00; linotype and stereotype, 8.00-8.50; electrotype, 7.50-8.00; mixed babbitt, 8.00-8.50.

Monel: Clippings, 27.00-28.00; old sheets, 24.00-25.00; turnings, 18.00-19.00; rods, 25.00-26.00.

Nickel: Sheets and clips, 53.00-55.00; rolled anodes, 53.00-55.00; turnings, 39.00-40.00; rod ends, 53.00-55.00.

Zinc: Old zinc, 2.50-2.75; new diecast scrap, 2.75-3.00; old diecast scrap, 1.00-1.50.

Aluminum: Old castings and sheets, 9.00-9.50; clean borings and turnings, 4.50-5.00; segregated low copper clips, 11.00-11.50; segregated high copper clips, 10.00-10.50; mixed low copper clips, 10.50-11.00; mixed high copper clips, 10.00-10.50.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 10.00-10.50; clean borings and turnings, 7.00-7.50; segregated low copper clips, 15.00-15.50; segregated high copper clips, 13.50-14.00; mixed low copper clips, 12.50-13.00; mixed high copper clips, 12.00-12.50.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 10.50-11.00; clean borings and turnings, 8.50-9.00; segregated low copper clips, 14.00; segregated high copper clips, 13.00; mixed low copper clips, 13.00; mixed high copper clips, 12.50.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 55.00; light scrap, 50.00; turnings and borings, 35.00.

Copper and Brass: No. 1 heavy copper and wire, 24.50; No. 2 heavy copper and wire, 23.25; light copper, 21.00; refinery brass (60% copper) dry copper content, 21.00.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 24.50; No. 2 heavy copper and wire, 23.25; light copper, 20.50; No. 1 composition borings, 20.00-21.25; No. 1 composition solids, 21.00-21.75; heavy yellow brass solids, 15.50-16.75; yellow brass turnings, 13.50-15.75; radiators, 16.50-16.75.

Plating Material

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.60.

Copper: Flat-rolled, 46.04; oval, 42.50; electrodeposited, 38.00; cast, 40.50; 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, 114.25; 100-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29,999 lb, 105.25; 30,000 lb, 103.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 120.50; 200-499 lb, 119.00; 500-999 lb, 118.50; 1000 lb or more, 118.00.

Zinc: Balls, 18.75; flat tops, 18.75; flats 21.50; ovals, 20.75, ton lots.

CHEMICALS

Cadmium Oxide: $1.60 per lb in 100-lb drums.

Chromic Acid (flake): 100-2000 lb, 31.00; 2000-10,000 lb, 30.50; 10,000-20,000 lb, 30.00; 20,000 lb or more, 29.50.

Copper Cyanide: 100-200 lb, 65.90; 300-900 lb, 63.00; 1000-19,000 lb, 61.90.

Copper Sulphate: 100-1900 lb, 15.00; 2000-5900 lb, 13.00; 6000-11,900 lb, 12.75; 12,000-22,900 lb, 12.50; 23,000 lb or more, 12.00.

Nickel-Chloride: 100 lb, 45.00; 200 lb, 43.00; 300 lb, 42.00; 400-4900 lb, 40.00; 5000-9900 lb, 38.00; 10,000 lb or more, 37.00.

Nickel Sulphate: 5000-22,999 lb, 29.00; 23,000-39,900 lb, 28.50; 40,000 lb or more, 28.00.

Sodium Cyanide (Cyanobrik): 2000 lb, 23.80; 400-900 lb, 20.80; 1000-4900 lb, 19.80; 5000-19,900 lb, 18.80; 20,000 lb or more, 17.60.

Sodium Stannate: Less than 100 lb, 79.50; 100-600 lb, 70.20; 700-1900 lb, 67.40; 2000-9900 lb, 65.60; 10,000 lb or more, 64.20.

Stannous Chloride (Anhydrous): 25 lb, 155.00; 100 lb, 150.10; 400 lb, 147.70; 800-19,900 lb, 106.80; 20,000 lb or more, 100.70.

Stannous Sulphate: Less than 50 lb, 140.20; 50 lb, 110.20; 100-1900 lb, 108.20; 2000 lb or more, 106.20.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

Rails, Cars . . .

Track Material Prices, Page 165

Railroad car orders in January this year totaled 1339 units, down sharply from the 2705 placed in December, 1960, and the 5742 reported in January, 1960, reports the American Railway Car Institute and the Association of American Railroads. Deliveries of new cars in the month were 3515 vs. 4272 in December last year and 2849 in January last year.

The backlog of cars on order as of Feb. 1 showed 13,871 units in railroad shops, and 5023 in shops of contract builders, a total of 18,894. That compares with 21,070 on order and undelivered as of Jan. 1 and 48,170 on Feb. 1, 1960.

Structural Shapes . . .

Structural Shape Prices, Page 160

Heavier tonnage is being estimated by the structural fabricating shops as the seasonal resurgence in building and construction begins. More tonnage is being figured for shipment in late spring and early summer; most of the larger shops hold fair order backlogs.

January bookings by the structural mills were better than those in December, and the volume of February orders has been at least 2 to 3 per cent above that of the preceding month. Expectations are that March will register a similar gain, the rise in orders accelerating as spring advances.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

4295 tons, state bridgework, Route 95, Sec. 1H, Bergen County, New Jersey, through Poirier & McLane Corp., to American Bridge Div., U. S. Steel Corp., Pittsburgh.

2216 tons, state bridgework, PSC 6607, Niagara County, New York, through A. E. Ottavino, general contractor, to Ernst Steel Corp., Buffalo.

1750 tons, nurses' residence, Bronx Municipal Hospital, New York, through Terminal Construction Co., general contractor, to Dreier Structural Steel Co., Inc., Long Island City, N. Y.

1000 tons, R. H. Macy Department Store, White Plains, N. Y., through Robert Glen, to Elizabeth Iron Works, Union, N. J.

1000 tons, R. H. Macy Department Store, Toledo, Ohio, to Mississippi Valley Steel Co., St. Louis.

1000 tons, five state bridges for an interchange at Towson, Md., to Cumberland Bridge Co., Camp Hill, Pa.

900 tons, plant, Maryland Cup Corp., Baltimore, to Lehigh Structural Steel Co., Allentown, Pa.

700 tons, high school, Mineola, N. Y., through Joseph Bisieglia & Sons Inc., general contractor, to August Bellon, Long Island City, N. Y.

550 tons, development laboratory, International Business Machines Corp., San Jose, Calif., to Herrick Iron Works, Oakland, Calif.

400 tons, addition, General Telephone Bldg., 730 Third Ave., New York, through Turner Construction Co., general contractor, to Simon Holland & Son, Brooklyn, N. Y.

250 tons, Doctors' Hospital, Staten Island, New York, through Krauss Construction Co., general contractor, to Bethlehem Fabricators, Bethlehem, Pa.

250 tons, air route traffic control center, Slidell, La., to City Steel Co.

225 tons, Tacoma's Mayfield Dam trestle, to Star Iron & Steel Co., Tacoma, Wash.

STRUCTURAL STEEL PENDING

8485 tons, Flushing Meadows Municipal Stadium, New York, T. J. Carlin, Atlas Tile & Marble Co. and Thomas Crimmins Construction Co. low jointly on general contract.

2400 tons, Sixth Avenue municipal subway, between Ninth and 19th Streets, New York, Maclean-Grove & Co., New York, low on general contract.

1800 tons, plant, Goodyear Tire & Rubber Co., Beaumont, Tex., Scientific Design Co., New York, general contractor.

1713 tons, state bridgework, FASH 61-1, Suffolk County, New York, Hendrickson Bros. Inc., low on general contract.

1301 tons, state highway work, FOWOBE 61-1, Nassau County, New York; bids closed.

1160 tons, state bridge, Chester County, Pennsylvania, Barlanti Construction Co., Harrison, N. Y., low on the general contract.

1054 tons, also 250 tons of reinforcing, involving 90 steel towers, government furnished, Schedule 1V, Wasco, Hood River, and Clackamas Counties, Oregon, 19.2 miles of transmission line; Charles T. Parker Construction Co., Portland, Oreg., low at $263,911 to Bonneville Power Administration, Portland, Oreg.

1000 tons, plant facilities, Western Electric Co., Leetsdale, Pa.; bids closed Feb. 15.

875 tons, state highway work, FISH 61-6 and FASH 61-7, Monroe County, New York; bids closed Feb. 23.

860 tons, state campus site, No. 7, Albany.

CLASSIFIED

84" REVERSING MILL

20½" x 56" x 84"—4 High combination reversing, cold reduction & temper rolling mill. May be inspected in operation. Send for detailed quotation.

WENDER PRESSES, INC.
1957F Clay Detroit 11, Michigan

Machinery and Equipment Wanted

WANTED

Used SIZE 2 OR 3 FOURSLIDE FORMING MACHINES. BAIRD, MANVILLE, U. S. MULTISLIDE.

R. F. NAUMAN MFG. CORP.
222 Chicago Street Buffalo 4, N. Y.

Representatives Wanted

TOOL ACCESSORY MANUFACTURER REQUIRES energetic representation in many areas. Must be familiar with machine tool distributors. Write Box 904, STEEL, Penton Bldg., Cleveland 13, Ohio.

Help Wanted

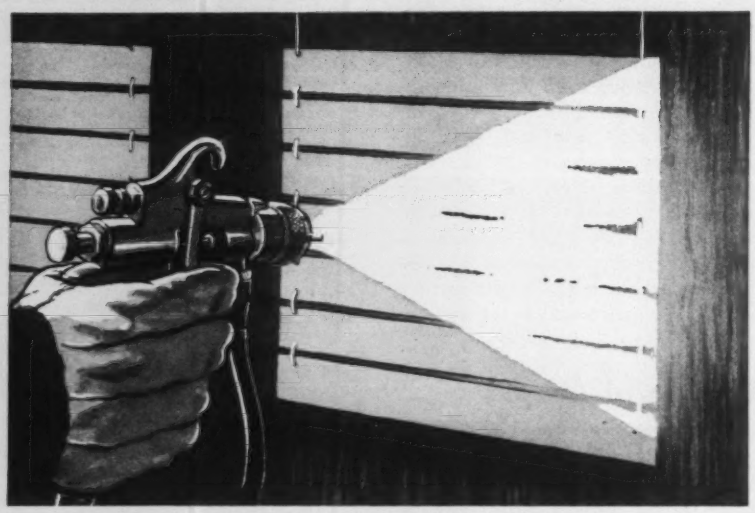
SALESMAN TO COVER CHICAGO TERRITORY selling mill and heavy industrial overhead traveling cranes. Respond to Box 893, STEEL, Penton Bldg., Cleveland 13, Ohio.

PROGRESSIVE STEEL MILL desires services of established Salesman familiar with High Carbon Strip and Round Wire Specialties for Atlantic Seaboard. Box No. 907, STEEL, Penton Bldg., Cleveland 13, Ohio.

To avoid spray booth troubles

ask Oakite

OVER 50 YEARS CLEANING EXPERIENCE • OVER 250 SERVICE MEN • OVER 160 MATERIALS



Oakite curtain water treatment takes the "tack" out of overspray

Just a few inexpensive ounces of the right Oakite additive in the spray booth water curtain save hours of clean-up time. The reason: Oakite chemicals surround each droplet of paint with an "anti-stick" film that keeps spray from adhering to walls, pumps, lines and water nozzles. Paint that doesn't settle or float immediately will still wash through the system—but it won't stick, won't clog the sprays. The result: a water curtain without gaps, a smooth running system, *no* unplanned downtime.

There's a full line of Oakite water additives . . . one to match any of the countless paints, enamels and organic coatings. The *right* one will help paint sink to the sump . . . or float to the surface for skimming off . . . or overcome special hard water troubles . . . or combat foaming problems. What's *your* problem? Ask the Oakite man to make free tests in your paint spray booth. They won't interfere with production. They may save you hours of spray booth downtime. Bulletin F-9443 tells more. Write Oakite Products, Inc., 28A Rector St., New York 6, N. Y.

it PAYS to ask Oakite

OAKITE

over 50 Est. 1909 SCIENCE

years' leadership in industrial cleaning

N. Y., Depot Construction Co., Long Island City, N. Y., low on general contract.

800 tons, computer building, General Electric Co., Phoenix, Ariz.; pending.

756 tons, state bridgework, Philadelphia County, Pennsylvania; Buckley & Co., Philadelphia, is low on the general contract.

649 tons, state bridgework, FISH 61-2, Saratoga County, New York, Lane Construction Co., low on general contract.

REINFORCING BARS . . .

REINFORCING BARS PENDING

1191 tons, state bridgework, LR 246 (17), Allegheny County, Pennsylvania, bids Mar. 3; also required are 154 tons of structural steel.

1009 tons, state bridgework, Allegheny County, Pennsylvania, bids Mar. 3; also required are 2303 tons of structural steel.

650 tons, theater and other buildings, Seattle Civic Center; General Construction Co., Seattle, low at $1,995,000.

380 tons, Federal Science Bldg., Century 21 Exposition, Seattle; general contract to Purvis Construction Co., Spokane, Wash., at $4,133,946.

290 tons, sewage disposal plant, Coatesville, Pa., Tri-County Construction Co., North Hills, Pa., low on the general contract.

225 tons, prestressed steel water reservoir, Alderwood Manor, Wash.; general contract to Rasmussen-Beck, Seattle, joint low at $592,337.

PLATES . . .

PLATES PLACED

14,500 tons, fabricated water main, ranging up to 109 in. in diameter, for the Susquehanna Water Supply Commission, Harford County, Maryland, through C. J. Langenfelder, Baltimore, general contractor, to Bethlehem Steel Co., Bethlehem, Pa.

300 tons, cranes for Trinity Dam project, Northern California; also 100 tons, crane for Mayfield Dam, Tacoma, Wash., and 100 tons for crane for Bureau of Reclamation, to Star Iron & Steel Co., Tacoma, Wash.

PLATES PENDING

5000 tons, Captain Anthony Mildahl Dam, Chilo, Ohio, Arthur A. Johnson and Peter Kiewit Sons Co., New York, low, jointly on general contract.

1200 tons, water storage tank, Vernon District, Portland, Oreg.; Chicago Bridge & Iron Co., Seattle, low bidder.

1000 tons, 32,000 ft of 20-24 in. water supply line, Port Angeles, Wash.; Del Guzzi Construction Co., Port Angeles, low for steel pipe at $1,139,016; alternative concrete cylinder, Harbert Construction Co., Tacoma, Wash., low at $943,823.

200 tons, Spruce Run Reservoir, Trenton Township, New Jersey, Elmhurst Contracting Co., low on general contract.

200 tons or more, also shapes, 342 ft ferry; Victoria Machinery Depot, Victoria, B. C., low at $3,619,512 to the British Columbia Toll Highways & Bridge Authority.

110 tons, 25,000 barrel fuel tank with floating roof, Bunker Hill AFB; bids Feb. 28, Great Lakes, Ill.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Toledo, Peoria & Western, one 1800-hp road switcher, to Electro-Motive Div., General Motors Corp., La Grange, Ill.

RAILROAD CARS PLACED

Norfolk & Western, 1000 eighty-five-ton coal hoppercars, to its Roanoke, Va., shops.

St. Louis-San Francisco Railway, 100 seventy-ton insulated boxcars to ACF Industries Inc., New York.

RAILROAD CARS PENDING

Philadelphia Passenger Service Improvement Corp., 52 commuter cars, contemplated; 36 will be for operation by the Pennsylvania Railroad and 16 by the Reading Railroad. Bids will be asked when a committee of railroad and city engineers complete specifications.

Advertising Index

Abell-Howe Co. 127
Acme Chain Corporation 6
Acme-Newport Steel Co. 146
Ajax Magnethermic Corporation 2
Alan Wood Steel Co. 29
Allen-Bradley Co. 134
Allen Manufacturing Co. 100
Aluminium Limited Sales, Inc. 130, 131
American Nickeloid Co. 85
Anaconda American Brass Co. 175
Armstrong-Blum Manufacturing Co. 102
Associated Spring Corporation 52
Avco Corporation, Nashville Division 7

Babcock & Wilcox Co., The, Tubular Products Division ..... Inside Front Cover
Barnes, Wallace, Co., Ltd. 52
Barnes, Wallace, Division, Associated Spring Corporation 52
Barnes, Wallace, Steel Division, Associated Spring Corporation 52
Bethlehem Steel Co. 1
B-G-R Division, Associated Spring Corporation 52
Bishop, J., & Co. Platinum Works, Tubular Products Division 24
Bliss, E. W., Co., Rolling Mill Division 11
Buffalo Forge Co. 49
Bullard Co., The 54

Carpenter Steel Co., The 104, 105, 173
Cincinnati Shaper Co., The 16
Cleveland Crane & Engineering Co., The, Steelweld Division 40
Columbia-Geneva Steel Division, United States Steel Corporation 41, 42, 43, 44, 45, 56, 57, 154
Cone-Drive Gears Division, Michigan Tool Co. 97
Continental Steel Corporation 106

Dana Corporation, Parish Pressed Steel Division 128
DeVilbiss Co., The 66
Drop Forging Association 101
Dunbar Brothers Division, Associated Spring Corporation 52

Elastic Stop Nut Corporation of America .. 95

General Motors Corporation, Hyatt Bearings Division 82
General Steel Castings Corporation, National Roll & Foundry Division 61
General Time Corporation, Stromberg Division 103
Gerlinger Carrier Co. 55
Gibson Division, Associated Spring Corporation 52
Gisholt Machine Co. 3
Goodyear Tire & Rubber Co., Inc., The, Industrial Products Division 12, 13
Great Lakes Screw Corporation 119

Hallden Machine Co., The 121
Harnischfeger Corporation 59, 60
Hill Acme Co., The 143
Horsburgh & Scott Co., The 152
Houghton, E. F., & Co. 58
Hyatt Bearings Division, General Motors Corporation 82

Inland Steel Co. 76

Jessop Steel Co. 109
Jones & Lamson Machine Co., Machine Tool Division 96
Jones & Laughlin Steel Corporation 22, 23

Kaiser Aluminum & Chemical Sales, Inc., Kaiser Refractories & Chemicals Division 136, 137
Keystone Steel & Wire Co. 163
Koppers Co., Inc., Engineering & Construction Division 36, 37

Landis Machine Co. 8, 9
Lodge & Shipley Co., The 150

Manross, F. N., & Sons Division, Associated Spring Corporation 52
Marathon Specialty Steels, Inc. 75
Michigan Tool Co., Cone-Drive Gears Division 97
Midwest Steel Division of National Steel Corporation 34, 35
Milford Rivet & Machine Co., The 89
Milwaukee Division, Associated Spring Corporation 52
Minster Machine Co., The 107
Mobil Oil Co. 30, 31
Mueller Brass Co. 33
Mundt, Charles, & Sons 179

National Acme Co., The 38, 39
National Roll & Foundry Division, General Steel Castings Corporation 61
National Steel Corporation 34, 35
National Tube Division, United States Steel Corporation 56, 57
Nauman, R. F., Mfg. Corporation 177
New England High Carbon Wire Corporation.. 88
Niagara Machine & Tool Works 148
Northern Engineering Works 32

Oakite Products, Inc. 178
Ohio Division, Associated Spring Corporation 52
Ohio Steel Foundry Co., The 90
Osborn Manufacturing Co., The 151

Pangborn Corporation 98, 99
Parish Pressed Steel Division of Dana Corporation 128
Philadelphia Gear Corporation 110
Pittsburgh Steel Co. 50, 51
Polymer Corporation of Pennsylvania, The .. 153
Pratt & Whitney Co., Inc. 25, 26, 27, 28

Raymond Manufacturing Division, Associated Spring Corporation 52
Republic Steel Corporation 14, 15

Sandvik Steel, Inc. 170
Seaboard Pacific Division, Associated Spring Corporation 52
Selas Corporation of America 64, 65
Simonds Gear & Mfg. Co., The 129
Snap-On Tools 108
Stromberg Division, General Time Corporation 103
Stuart, D. A., Oil Co., Ltd. 47, 48

Tennessee Coal & Iron Division, United States Steel Corporation 41, 42, 43, 44, 45, 154
Texaco, Inc. 53
Timken Roller Bearing Co., The, Steel & Tube Division 86
Tinnerman Products, Inc. 122
Torrington Co., The 21
Towmotor Corporation 55
Tubular Rivet & Stud Co. 62
Tyler, W. S., Co., The 81

United Engineering & Foundry Co. 145
United-Greenfield Corporation, J. H. Williams & Co. Division 93
United States Pipe & Foundry Co., Steel & Tubes Division 124, 125
United States Steel Corporation, Subsidiaries 41, 42, 43, 44, 45, 56, 57, 140, 141, 154
United States Steel Export Co. 41, 42, 43, 44, 45, 56, 57, 154
United States Steel Supply Division, United States Steel Corporation ..41, 56, 57, 140, 141
Urick Foundry Co. 10

Van Huffel Tube Corporation 156, 157

Warner & Swasey 4
Wean Engineering Co., Inc., The ....Back Cover
Weirton Steel Division of National Steel Corporation 34, 35
Wheland Co., The 155
Williams, J. H., & Co., Division of United-Greenfield Corporation 93
Wilson, Lee, Engineering Co., Inc. .....Inside Back Cover

~ ~ ~

Table of Contents, Page 19

Classified Advertising, Page 177

MUNDT

a name with over 83 years experience ready to serve the industry at all times with the

PERFORATED

requirements necessary for your equipment, machinery or parts in any form or types of

METAL

or fibre, cardboard, paper, soundboards and other materials in a workmanlike manner that

MEANS

lasting performance, better quality, and above all a product that will give you a

PERFECT

job for the particular purpose for which it is to be used, without defects, burrs or camber to

SCREENS

because our up-to-date equipment, plus our engineering counsel gives you nothing but the best.

Specially Fabricated for
ALL INDUSTRIES
BY
CHARLES MUNDT & SONS
53 FAIRMOUNT AVE.
JERSEY CITY 4, N. J.
PHONE—DELAWARE 3-6200
Send for Illustrated Catalog

Can you understand this man's hunger for Tools?

Without them he's useless—a burden to himself and the earth. ■ With tools in his hands—a spade, a hoe, a trowel, a rake—he could raise food enough for his own family and perhaps other hungry villagers. ■ But for this man and countless others like him in Greece, in India, in Latin America and other desperately poor areas—the simplest steel implements are beyond reach. They cost too much. So millions of acres are barely scratched...with forked sticks or wooden ploughs...and two-thirds of the world's people still go to sleep hungry. ■ Will you help them till the fertile earth...through CARE? Wherever possible, CARE food distribution is coupled with a tools-for training program that enables men and women to become self-supporting. The need was never greater, the rewards never richer. ■ *Will you buy an extra tool*—to put into hands hungry for work, food, and dignity? ■ Send dollars to CARE, New York 16.

CARE

COOPERATIVE FOR AMERICAN RELIEF EVERYWHERE, INC.
660 FIRST AVE.
NEW YORK 16, N.Y.

Here is $_____ for food ☐ tools ☐ books ☐ medicine ☐ CARE's choice ☐

(PLEASE MAKE CHECKS PAYABLE TO CARE, INC.)

NAME_____

ADDRESS_____

_____

(Space donated by this publication)

How Empire-Reeves gets better quality silicon steels, faster

Lee Wilson open coil annealing improves uniformity, facilitates delivery, reduces inventory at Empire-Reeves

"Improved customer service," reports Donald W. Frease, President of Empire-Reeves Steel Corporation," is just one of the assets the addition of the Lee Wilson Open Coil Annealing has given Empire."

"We can now process orders with much greater speed," he continues, "yet we can reduce our inventory in the annealing department, because—by opening the coil—hot gases can saturate the entire coil in a fraction of the time previously required. Cool-down is just as efficient.

"The quality of our silicon steels, as well as others processed through the Open Coil system, is vastly improved because the heat quickly reaches every square inch of the surface of the steel coil. This means it receives a perfectly uniform anneal with an absolute minimum of hardness variation. Because we are handling individual coils instead of continuous strip we have wonderful flexibility. We can process short orders as easily as long runs.

"The Lee Wilson Open Coil Process thus enables us to improve our customer service and our product, and at the same time, gives us the most efficient annealing system available today," Mr. Frease, concludes.

If a better product or more efficient annealing department appeals to you, why not get the last word on annealing practice. The Lee Wilson sales engineer in your area will be happy to meet with you at your convenience.

Donald W. Frease, President of Empire-Reeves Steel Corporation (center), tells J. L. Whitten, Vice President of Sales of Lee Wilson (right), and E. G. Fenton of Empire, the results of Open Coil Annealing at Empire after the first few months of operation.

Overall view of the Lee Wilson Open Coil Annealing installation at Empire-Reeves' Mansfield, Ohio, plant.

Lee Wilson® ENGINEERING COMPANY, INC.
20005 LAKE ROAD • CLEVELAND 16, OHIO
HIGH PRODUCTION ANNEALING SYSTEMS
MAKE THE BEST METALS BETTER
® ORIGINATORS AND LEADING PRODUCERS OF OPEN COIL AND SINGLE STACK FURNACES
4081

No. 5 and 6 continuous silicon annealing lines, Vandergrift plant, U. S. Steel Corporation

Wean, U.S. Steel and Silicon Annealing . . .

The two silicon annealing lines featured above—and a third line in an adjacent building—were recently installed at the Vandergrift plant of United States Steel. Precision-engineered by Wean Engineering Company, these new lines are designed to assure exact molecular consistency of the strip for the required electrical properties of grain-oriented silicon material.

U. S. Steel's silicon annealing lines are among the many continuous annealing lines designed by Wean for the American steel industry. Every major steel company in this country has used Wean continuous process equipment in supplying its customers' needs; many of these installations being specifically designed to satisfy unique requirements. Whether your production planning involves silicon annealing or some other type of continuous strip processing, Wean's experience and *creative engineering* can work for you.

THE WEAN ENGINEERING COMPANY, INC. · WARREN · OHIO